

Special
Review Issue

January 1984

\$2.95

Color Computer

MAGAZINE

For TRS-80™ Color Computer & TDP-100™ Users

REVIEWED

- Dragon 64
- A Look at Compuserve
- Microneye Digital Camera
- HJL Keyboard
- Radio Shack Daisy Wheel Printer
- 15 DBMs Compared
- RDC Disk Controller
- Mozart Composer
- Words That Act

GAMES

- Time Patrol
- Fury
- Fire Copter
- Buzzard Bait
- Calixto Island
- Glaxxons
- Hyperzone
- Gin Champion
- Pooyan
- Wizard 64
- Zeus
- Babylon
- Starship Hercules



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01

*™ Tandy Corporation

Computerware® Hit Parade...



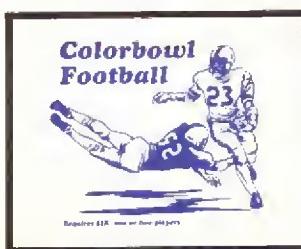
Poor Jr must overcome four screens to rescue The King from Luigi. Traverse the jungle & swamp, climb vines, avoid vine gators, dodge Zuzu birds, open locks, & conquer Luigi's hideout.

32K C \$28.95 32K D \$31.95



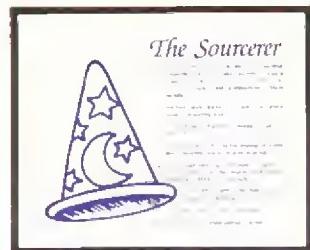
Use speed, skill, & concentration to race your car over the track, dodge competitors, & beat the clock. Taste the road dust, smell burning rubber, feel the press of speed on your chest!

32K C \$21.95 32K D \$24.95



Big league graphics! Two players against each other or one can practice offense against the computer. 7 defensive & 8 offensive plays plus many formations.

32K C \$26.95 32K D \$29.95



This menu driven symbolic 6809 disassembler produces symbolic source code that can be assembled. Automatic equate generation. FCC, FCB, & FDB generation. Written in position independent code, it is relocatable to any memory area. User defined symbol/label area. Produces files with or without line numbers. Can symbolize all extended addresses if desired. Written in assembly language for extreme speed. Disassemble to disk or cassette, printer, or screen.

16K C \$34.95 16K D \$39.95



Bio Detector

A serious health aid for biofeedback training & a fun family game for "truth detection"! Real silver velcro finger grips attach to the detector box that plugs into the joystick slot. Now watch & listen to the galvanic skin response being graphed on the screen. An impressive experience for a friend who asks "what does your computer do?" All hardware, Bio Feedback program & Anxiety Attack game included. [Results not admissible in court!] (Req. 16K)

\$34.95



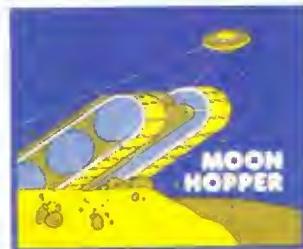
From the cockpit of your ship, see the real 3-D field of hyper space. Dodge oncoming space debris & destroy attackers as they whiz past. A new dimension in space games!

32K C \$26.95 32K D \$29.95

Flexi Filer

Comprehensive & flexible data base manager. Collect up to 35 fields with up to 240 characters per record using your own names & format. With logical operators select any subset of records using up to 36 different criteria. Sort all or any subset of records in ascending or descending order on any of the 35 fields, with a fast assembly language sort. Design customized labels & reports with automatic page numbers, page headings, & totals of numeric fields.

32K D \$64.95



Travel through different time zones, fending off attacking craft from each period with a full 360 degree firing range. See blimps, helicopters, & all kinds of space vehicles.

32K C \$26.95 32K D \$29.95

Your landing craft rolls over the surface with its tractors, hops over craters & rocks, & phasers attacking aliens to get to home base. Super graphics & sound!

32K C \$24.95 32K D \$27.95

Color Basic Compiler

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32K D \$39.95



He jumps across pyramids of brightly colored cubes, dodges springs & bad eggs, using elevator squares, & gaining points as he clears the cubes towards the next screen.

32K C \$26.95 32K D \$29.95



Authorship Program

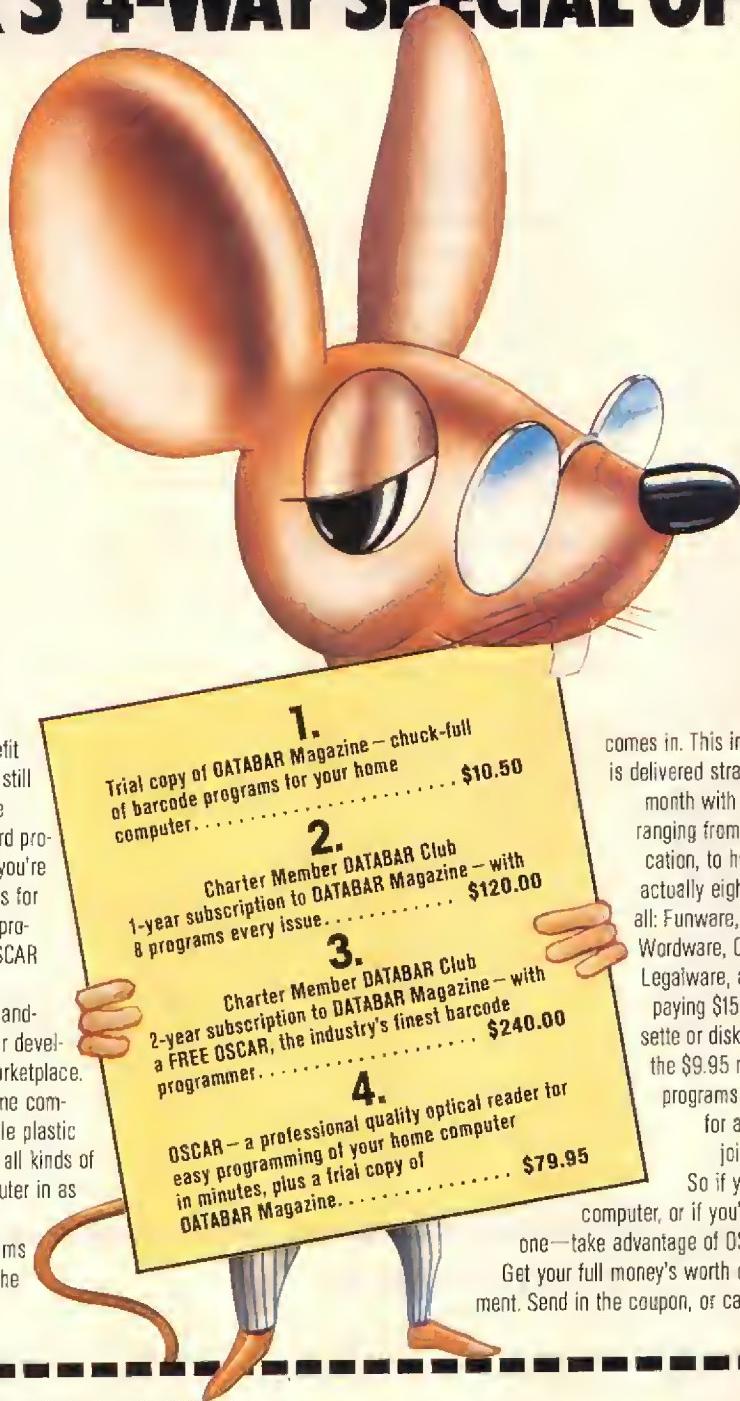
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Taking the bite out of the controller.

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(Review)

89/SEARCH! by Stephen Allen
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93/Digital View Camera by Howard Basson
Images through your computer.

(Review)

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102/Generic Tests by Robert Toscani
Enter any topic — test on any topic.

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108/Color Computing for Kids by Jean Plessner
A review table, new commands, and games.

(Education)

114/How to Remember Not to Forget by Norman Garrett
Date conversions made easy.

(Math)

117/File It by Keith Baker
A DBM for your own use.

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128/Stepper by David Jenkins
One line at a time debugging.

(Utility)

132/Directory:XXX by Byron Palmer
Keeping track of cassette tracks.

(Utility)

DEPARTMENTS

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Games, printers, books, and more!

153/NEW:PRODUCT\$

158/END OF FILE

160/FOR...NEXT (02,84)

Cover

"But Holmes, what can it all mean?" by Jim Sollers

ABC membership applied for.

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PEEK (01,84)

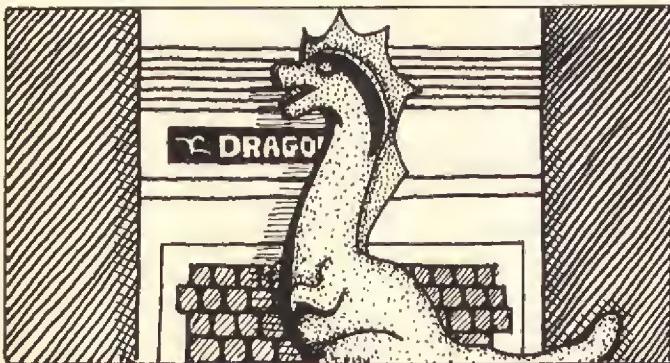
Now that you all have received your holiday computing gifts, we expect you've already started a wish list for next December, and your birthday, and your next pay check, and... well, let's face it, we could go on and on buying more goodies.

Now, before you spend that nice \$50 check rich old Uncle Albert sent you, sit down and think carefully about what your computing needs really are, and what they'll be six months from now. And especially, read this issue carefully. A good review can give you a priceless insight into a variety of products that you just *know* you have to have, and let you choose the very best of all of them. Sit back with the remains of the mulled holiday cider or eggnog, prop your feet up on that brand-new printer carton, get out the spectacles, and read on:

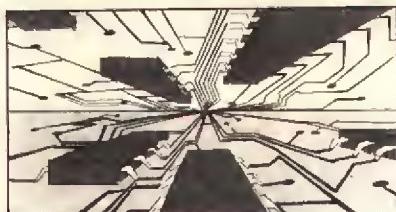
Everyone needs a data base, at some point in time. Even kids have lots of "stuff" to keep track of. But there are so many DBM's on the market, where do you even start when you need to find one to suit your needs and wallet? GOTO 55 and read Scott Norman's comparison review of data base managers for the Color Computer.



CompuServe is a word we've all heard, a few have experienced, and more have wondered about. Whether you're a seasonal user, a curious initiate or just wondering, you should GOTO 42 to discover what CompuServe is, what it does, how to get on it, and especially, to pick up some shortcuts. Terry Kepner (our Defusr answer oracle will continue this introduction in a periodical column, full of hints and tricks — The CompuServe Connection.

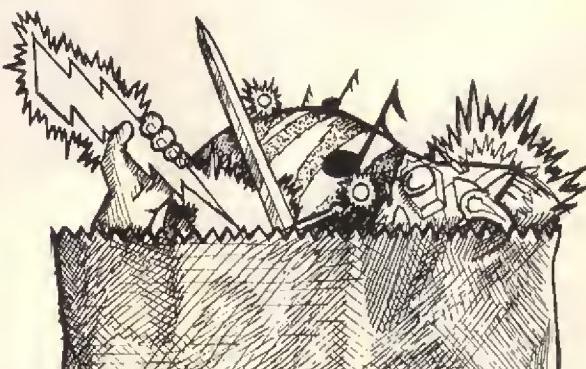


You only *thought* that Dragons are legendary beasts from medieval days. Well — The U.S. has recently had many Dragon sightings, and from all reports, the beast and the valiant knights who braved its den have prospered, sharing the Dragon's treasure. Doug Kelley and Larry Cadman, two of the early knights-errant, are willing to share some of the Dragon gold with us: GOTO 80 to discover what the Dragon is *really* about.



Disk controllers are necessary and expensive, but Gene Grunby would have us know there's a better way: build your own. GOTO 18, for Grunby's review of the RDC-1 disk controller.

Ever wished your Color Computer could do image processing? Who says it can't? GOTO 93 for a new view of what's possible, and a review of a neat peripheral — Digital Video Camera.



Games, adventures, keyboards, books, utilities, educational software, music, printers — you name it, we've got it. Check 'em out carefully: GOTO 27 and GOTO 134.

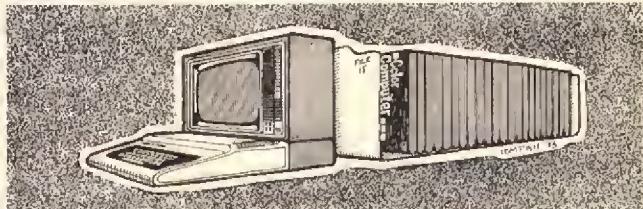
Now, some articles to help you use your holiday gifts better:

First GOTO 108 for the next step in programming, via Jean Plessier's "Color Computing for Kids." Then GOTO 22 for directions for making a disk drive indicator, so you'll never leave your new drives on inadvertently.

GOTO 30 to learn how to pack your programs tightly; GOTO 89 to learn how to find routines in memory. To speed up debugging some always-recurring errors, GOTO 98.

Teachers with a new machine should GOTO 102 for a generic test program that will make you happy.

Need quick date conversions? GOTO 114.



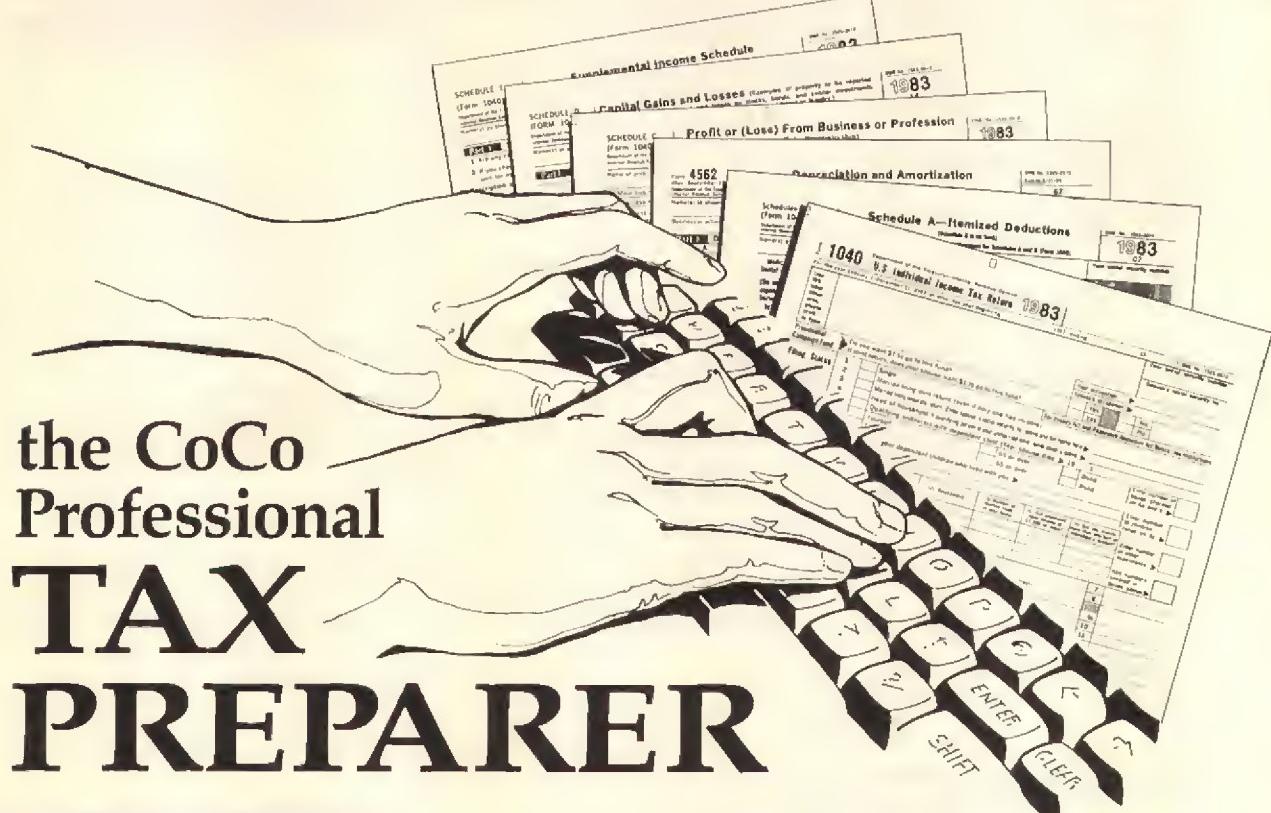
Oh, did we say data bases? Hey, you too can file it — GOTO 117. And if your program lists too quickly for you, you can step through it easily, if you GOTO 128.

Last, but not least, everyone needs a directory program. There's one here — GOTO 132.

We hope this issue helps you enjoy your new system to the full.

— D.M., Editor

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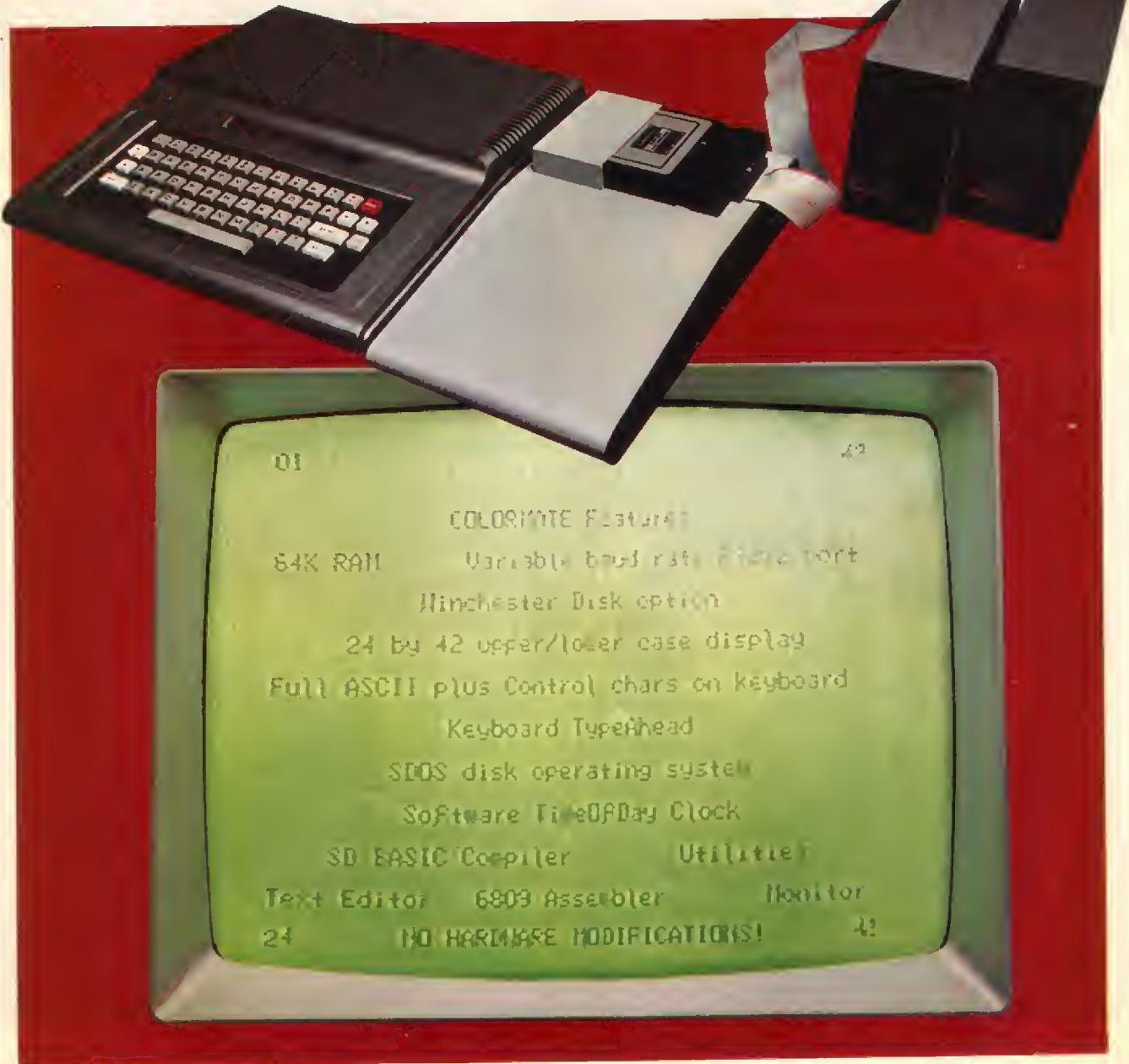
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Requires Extended
Color BASIC

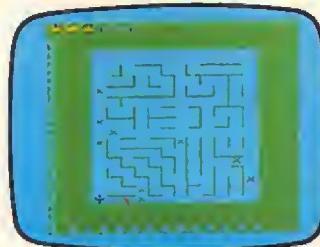
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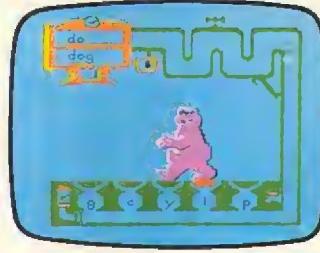
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All letters are subject to editing for space considerations.



INKEY\$ The Color Computer Magazine Highland Mill Camden, ME 04843

August EOF — Piracy NO MC-10

Re: the August "End of File": the subject is very valid, and it is an issue that has been around for a while. I recall some discussions on that very subject at my place of former employment.

I think there are basically two ways to deal with the problem, if indeed you wish to label it a problem.

First, make it economically unfeasible to copy programs. One way is to price the software very low, and hope to make the profit in increased sales. Also, unless a buyer is registered, he won't have access to updates as they come available.

The second is to just recognize the problem, and charge for it. My former employer didn't have any security devices on their software, and I believe their policy was that software back-ups and copies were ok, as long as it stayed in the organization to which it was sold, and wasn't resold. A common complaint from customers was that the software was a bit expensive, for obvious reasons. And, as you might expect, the software was copyrighted.

This does have some advantages: you sell fewer copies, but you still maintain your profit margin from the higher markup. Also, your customer base is smaller, so you have a lower database to maintain for software updates. By the way, they did charge for software updates; I believe it was a reproduction charge.

Clayton Y. Wong,
Honolulu, HI

I must complain about the amount of space you have been devoting to the MC-10 computer. Look on the cover of the latest issue of your magazine: what does it say under the title? It says: *for TRS-80 Color Computer and TDP-100 users*. It does not say anything about the MC-10.

I did not subscribe to your magazine to read articles about a computer I do not own in a magazine for the computer I do own. Have you come to depend on authors such as Dennis Kitsz, William Barden and others so much that you print anything they send you regardless of the computer it is for?

Lawrence Leonard
Bristol, VA

Hum. The MC-10 wasn't out

when we began *The Color Computer Magazine*; should we also ignore the new Color Computer, *The Dragon*, and anything else that's a good innovation? Come on — the MC-10 is a Radio Shack Color Computer, and not incompatible with our old standby, as our authors have shown. Maybe you'll learn something from those articles.

— Ed.s.

Ex-Paker

Since keying in Robert Blake's program from the August issue, I have been using my Color Scripsit program about three times as much as I used to. I feel much better about using it, now that I don't have to plug in the Program Pak. Unfortunately, because I own a DMP-200 I can not take advantage of the wide printing feature, and the Color Scripsit program does not allow for implanting control codes. This means that I can't use printer features such as underlining, superscript, subscript, or wide printing. But, Mr. Blake's program did allow me to put away the Program Pak which I have never trusted, or liked using.

I would like to congratulate Mr. Blake for a great program. And I would also like to suggest that he write a program which would allow me to copy all my

Program Paks to tape — with or without changes. I own eight Program Paks and hardly ever use them for fear of ruining my Color Computer.

Charles M. MacLeod
Taunton, MA

October EOF

In his "End of File" (October, 1983), Mr. Leichtman asks what readers think of the software rental business.

Software rental is little more than a camouflage for the gentlemanly art of theft. Everybody does it, and everybody knows that everybody does it.

Plagiarism is probably the third oldest profession, and there is probably no way to stop it. Pirated editions of Shakespeare's plays were very popular during the latter part of the sixteenth century and the early part of the seventeenth century.

Don't get me wrong; I have no software on the market at this time. I have no personal axe to grind. But theft is theft. Piracy is piracy.

Legislation is needed at the national level and at the state-house level. The only equitable procedure that I can think of is to require all software renters to pay a royalty to the authors for every software rental. Plays, films, and music all operate on such a basis.

James S. Purcell
Oxon Hill, MD

DBM Error

A small omission in Line 6110 of Paul Detwiler's useful DBM program published in your premier issue causes the BS error in Line 6140 when performing field sorts. Line 6110 should read: FOR Z=1 TO Q-1.

Ralph Berger
Santa Cruz, CA

More DBM

For those having trouble with the DBM program found in March issue; change the M variable in Lines 6560, 6570,

Bulletin Boards

Alaska BBS

Coco-Cold BBS, 4239-4 599th Street, Fort Wainwright, Alaska 99703, phone: (907)ELO-COCO, Voice Line: (907)356-1834. Thank you, Kerry Clabaugh (same).

Washington, DC

CoCo-Time, 703-569-3716, Washington, D.C.; Sysop: Jeff Beckerman. Run with tape, not disk!!

Sarasota, FL

The Color-80 (Silicon Rainbow Products) BBS system is run on a TDP-100, operational 24 hrs a day at 300 baud. The number is (813)924-COCO. We support uploading, downloading of Color Computer programs, E-Mail, color pictures and much more.

Our club meets the second Saturday and last Thursday of each month. Call our BBS or 813-921-7510 for more info.

6580 to some other letter. T works. M is the variable used in the DIM statement.

Our update to this program offers eight choices in the second menu; the original, plus number 5 — change data, number 7 — add data to file, number 8 — (a modified version of the) overlay update file (found in the September issue, pg. 10.) This program requires 32K, Extended not needed.

J. Chamberlain

Software Rental

The software piracy issue will probably occupy more printed

pages and raise more questions over the next few months than any single item since the introduction of the computer. 'Way back when Owls Nest Software was in the planning stages, we considered the problem very carefully. This was, of course, before the software rental houses became a reality.

Our feeling at that time was that while software piracy was indeed a problem, the main concern should be the paying customer. We felt an occasional situation where two or three people split the cost of a program might, at times, actually result in an extra sale. We decided that a legitimate buyer

of our programs was entitled to every benefit he or she expected, including the ability to make back-up copies.

As a result of that feeling, we adopted a firm policy of providing back-up instructions with every program we sell. That policy is still in effect today. It is, however, becoming more and more difficult to justify as correct. Yes — we feel the original customer has every right to a back-up, but our company has rights too. As both a consumer and producer I can wear two hats. I still feel our original decision was correct and we will continue to provide back-up information.

We maintain a record of all

original purchasers of our software. If a question or request arrives from a name we can't match we insist on proof that the person does indeed possess an original copy of our program.

The rental question will become the big one. It may drive many software houses out of business and prevent many more from going into business. This is a shame because it will lower the quality and selection of good software while raising the price. The irony of the situation is that the rental houses will be biting the hand that feeds them. They will be starving their source of supply.

If a rental house is sincere,

Clubs

Raleigh Club

The Raleigh, North Carolina Color Computer Club has over eighty members. We meet at 7:30 p.m. on the second and fourth Wednesdays. There are no dues yet, but the need for a newsletter may prompt us to institute a small fee in the future. Newcomers are always welcome. Contact: David Roper, P.O. Box 681, Garner, N.C. 27529.

Northwest Florida

The Northwest Florida Coco-Nuts (Color Computer Users' Group) meets on the first and third Fridays of every month at 7:30 p.m. in Fort Walton Beach, Florida. For more information contact: Bill Lamb (904)244-5281 or Jim Waits (904)837-6538.

Lincoln, NB

The first Color Computer Users' Group of Lincoln, Nebraska meets the third Saturday of every month between 12:00 and 2:00 in the afternoon. Membership to the club is free of charge and we do publish a monthly newsletter. Contact: Bruce Gregg, RR #1, Box #139, Hickman, NE 68372; telephone: (402)788-2563 or (402)475-5517.

San Bernardino/Riverside

A new Color Computer Users' club for San Bernardino/Riverside and vicinity, the Citrus Color Computer Club (CCCC or 4C's) invites those with TRS-80 Color Computers, TDP-100s, and Dragons to join our membership. Individual membership fees are \$12 for 1 year and family membership fees are \$20 for 1 year. For more information, please contact: Citrus Color Computer Club, C/O Personal Relations Chairman, 18227 Muriel Avenue, San Bernardino, CA 92407.

Spokane

Anyone interested in more information about the Northwest Computer Club can call Tim Watson at (509)928-5883 or Terry Thompson at (509)489-5133, or write to Judy Gehman, E. 14012 Cataldo, Spokane, WA 99216.

Calgary, Alberta

Our meetings will be held at 7:30 (p.m.), on the first

Wednesday of each month at the Queen Elizabeth High School, 512-18 Street N.W., Calgary, Alberta. Everybody is welcome! We would also like to establish inter-club activity by inviting other clubs, or members, to write about specific problems they have been at odds with. We will present these letters at our regular meetings, and if one of our members has a possible fix, they will be assigned as respondent. We are looking forward to hearing from all you 6809'ers out there! Contact: David A. Logan, Public Relations, P.O. Box 453, Trochu, Alberta, Canada T0M-2C0.

Dayton

For information about the Dayton Coco Users' Group, contact: Joe Evans, 609 Applehill Dr., West Carrollton, OH 45449.

Athens, GA

Anyone in the Athens, Georgia area who is interested in visiting or joining a Color Computer club: a group meets the first and third Tuesday at 7:30 p.m. in room 381 of the Science Library at the University of Georgia. If you need more information write to Rt. 2, Box 165-A, Watkinsville, GA, or simply come to the meetings.

Wichita, KS

The Color Computer Club of Wichita meets at 7 p.m. on the last Thursday of each month at Rivco, 1205 N. Mosley, Wichita, KS 67214. Anyone wishing more information can contact our president: Rex Rivers, 1205 N. Mosley, Wichita, KS 67214.

North Carolina

If you are interested in starting a Color Computer Users' Group in the Fayetteville, NC area, please contact Rich and Noel DeLuna, 5501 Crestview Place, Spring Lake, NC 28390.

Evansville, IN

Anyone interested in forming a C-C Club in the Evansville, IL area should contact Brian Brogues, Box 462, Poseyville, IN, 47633; telephone (812)874-2210.

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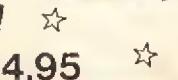
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they might request special protected versions of the programs they rent. If the customer decides to purchase he could be provided with a non-protected copy. This will not happen to any degree because I believe the main reason the product is rented is to copy it, not test it. The rental houses know full well if they used protected software they would soon be out of business.

Laws will be written and they will be broken. There is not a clear and easy solution. The pity is we all lose. First the author, who loses his royalty. Next the software house, which loses the sale, and finally the consumer, who has less selection of more expensive software to choose from.

Norman R. Shelton
President Owls Nest Software
Ooltewah, TN

More Bytes

The 32K Color Computer indicates 24871 bytes of available memory after turning the machine on and typing: ?MEM. By typing PCLEAR 1, the command ?MEM results in 29479 bytes. The difference is obtained from Graphic Screen Memory pages 2, 3 and 4.

Here is a short procedure to obtain 31015 bytes, provided the intended program contains no graphics: Type ?MEM Enter; Type PCLEAR 1 Enter; Type POKE 25,6 Enter; Type POKE 26,1 Enter; Type POKE 1536,0 Enter; Type NEW Enter; Type ?MEM Enter.

The POKE and New commands make the 1536 bytes of Graphic Screen Memory page 1 available for a total of 31015 bytes.

Dr. Konrad H. Kossman
Columbus, OH

OS-9/Flex

Dr. Pass's article comparing and contrasting OS-9 and Flex (September, 1983) was interesting and informative; however, there are some aspects of it that deserve comment.

Some details, most notably

the low price and bundling of the editor and assembler with the operating system, differ between Color Computer and non-Color Computer versions of OS-9. This, however, requires the use of 20/20 hindsight not available to you at the time the article was written or the September issue put together. In any case, I hope that readers read the advertisements and do not get a misleading impression of the relative prices of Color Computer OS-9 and Color Computer Flex.

Other points, however, are not time-dependent (so far):

1. The character separating commands that form part of a pipe is an exclamation point, not caret.

2. Requiring position-independent (and even reentrant) code is hardly a limitation on the 6809. The 6809 was designed to make such code easy to write. OS-9 takes advantage of that to provide the facilities it does, while Flex, a re-tread of a 6800 operating system, does not.

3. It is not at all clear that Flex is easier to use than OS-9. To give two examples: being

able to specify wild cards in file names is often considered dangerous and user-unfriendly by experts in human factors. (See Donald Norman's paper "The Trouble With Unix." I don't hold this to be an undesirable facility, just an example that ease of use is not an obvious thing. Let's see, how do you change default drives in Flex? ASN something or other...) Also, OS-9's multi-tasking facilities can be used in well-designed programs (such as Basic09 and the editor are) to let the user escape into the shell temporarily, avoiding some of the troubles associated with "modes" in computing systems.

4. How many users are concerned about the ease of debugging assembly language programs? It would seem far more important to be able to debug Basic programs easily, and Basic09's debugging capabilities are the equal of any I've had access to. There are better, but then nobody has implemented INTERLISP, Smalltalk, or CLU on a 6809 yet.

5. Dr. Pass correctly describes Basic09 floating-point numbers

as using roughly nine significant decimal digits; however, there is an inconsistency in his reporting of bits used. Each significant decimal digit requires about 3.3 significant bits, and sure enough, Basic09 uses 32 bits of a five-byte (40 bit) value for mantissa.

The cited 17 significant decimal digits for Flex's Basic, though, would require all 56 bits Dr. Pass describes as used. I can only conclude that he has omitted the size of the exponent from his calculations for the size of floating-point numbers for Flex's Basic. This means that Flex Basic must use at least eight bytes for each floating-point value.

Whether this is worthwhile or a problem is something for each user to decide, and indeed will change for a given problem. I should point out, though, that if one is truly interested in business applications, one wants decimal arithmetic. Does Flex Basic use BCD internally? I think not, given Dr. Pass's description, as it would then need 68 bits for 17 BCD digits (not counting the exponent).

I should also point out that Cobol, for which a great many business-oriented programs indeed exist, is available for OS-9.

6. It would seem that good I/O facilities are at least as important for business applications as decimal arithmetic. I cannot vouch for Flex Basic's abilities in this area, but I can state that Basic09's are quite good. I can also state that Basic09 provides reasonable control and data structures. If Flex's Basic does so, I have yet to see them. (They aren't there. Thanks to Wayne McGee for his article "A Tale of Three Basics," in the June, 1983 System 68 magazine.)

I shall not go into other details of Basic09, Pascal, or C as they run on OS-9, but in summary I shall state that I disagree strongly with Dr. Pass's contention that Flex is easier to use than OS-9, and while I would have to agree that OS-9 is easy to write new device drivers for, that is far from the only reason to choose OS-9 over Flex.

James E. Jones
Norman, OK

Fix (10,83)

Custom Color Fix

Those who make Dennis Kitsz's 64K upgrade (October, 1983) for Revision D boards should make these changes to the instructions:

In Step 5 change trace 2 to trace 3.

In Step 6 change trace 3 to trace 2.

In Step 8 change trace number 2 to trace number 3.

In Step 9 change trace number 2 to trace number 3.

In Step 10 change U35 pin 10 to U10 pin 35.

In Step 21 change C63 to C61.

Fix (11,83)

Sorcerer's Fix

Please note that in the Sorcerer's Puzzles (November, 1983, page 34) Programs 1 and 2 (Vortex and Jump Away Solitaire) will run in 4K Color Basic. Programs 3 and 4 (Flat Cubes and Logicolor) require 16K Extended Color Basic.

Slither Fix

The Slither Basic listing on page 47 (November, 1983) is missing Line 10: GOTO 4000.

DE



~~INFLATION~~

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Moptown Parade	EB90205C	\$40	\$31.95		EB90205D	\$45	\$36.95	
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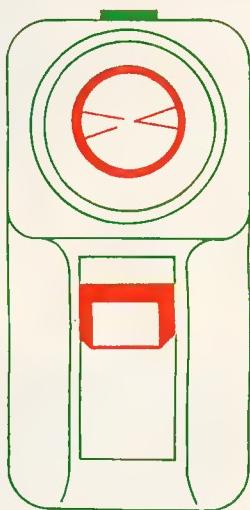
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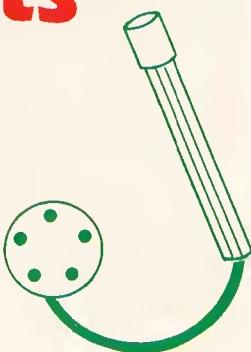
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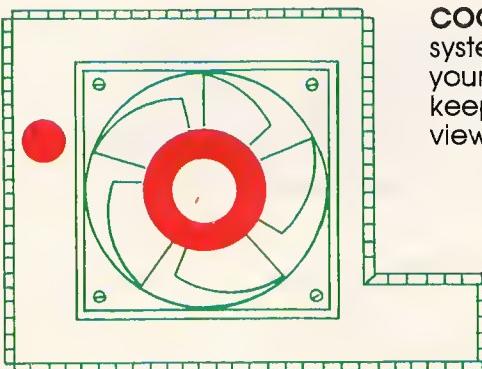
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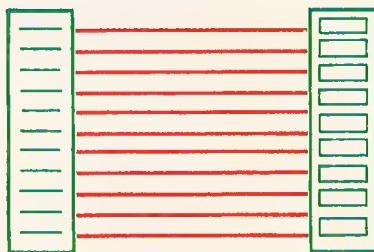
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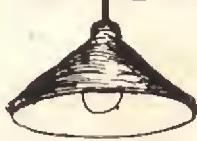
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Building the RDC-1 Disk Controller



A review!



by Eugene I. Grunby

THE RDC-1 IS a printed circuit board functionally equivalent to the Radio Shack Disk Controller for the Color Computer. This product should be of interest to owners of the Color Computer. It provides a less expensive alternative to the Radio Shack controller and offers more features.

Because the RDC-1 is not actually a kit, the purchaser will be shopping for the few necessary electronic components before assembling the controller. The marketing firm, F & D Associates, simplifies the builder's task by including the SMC9216B data separator chip with the circuit board. The floppy disk controller chip (FDC1793), the Radio Shack Disk Extended Basic ROM, and a plastic cartridge case are available at extra cost. As options, the board designer has permitted substitution of one of several ROMs in place of the Disk Extended Basic chip; this feature allows the controller board to accommodate custom firmware. The RDC-1 is an honest product and should receive serious consideration by anyone who can solder and has a basic understanding of circuit diagrams.

Why Build?

Assembled Radio Shack Disk Control-

lers are readily obtainable, so why build a controller? The reasons for each builder are individual. Often, a modest out-of-pocket cost savings can be realized; there is a personal sense of accomplishment and ownership; through the process of construction an understanding of the product is gained and may be useful for maintenance; and finally, the additional features and virtues of the product may make it more attractive than the unit it emulates.

Required Skills

With common sense and some insight, a person who has previously built electronic kits can successfully complete this project. The RDC-1 requires a moderate amount of assembly experience. However, only an experienced person with some electronic background will be able to diagnose problems due to faulty components. Novices should beware and not attempt construction! There is no warranty or repair service for the final product. For the inexperienced builder, the vendor has indicated to this reviewer that assembly service can be obtained for about \$25. If the purchaser finds that this project demands more than expected, the circuit board and documentation can be returned for an immediate refund.

Product Description

The RDC-1 printed circuit board shows sensible planning and sufficient attention to quality. The board is glass epoxy and has tracings on both surfaces. Board topography is logical and simple. The two card-edge connector surfaces are tinned, rather than bearing gold inlays in deference to cost. Although the card-edge to be inserted into the computer cartridge port omits two extra ground connections, they are not essential. These ground paths were meant to reduce TV interference but were not very effective. The numerous configuration options and features are described in a later section.

By virtue of the data separator chip that is supplied with the board, no calibration or adjustment of the circuits is required. Performance problems due to alignment errors or drift should not occur.

A photocopy of the User's Manual is provided. The manual clearly states that it was written recently and may have a few errors or omissions. Except for a few problems mentioned later, the manual withstood the test of use. However, only a bare minimum of information is available. The sections of the manual are titled: "Description," "Ordering Parts," "Options," "Sample EPROM/ROM Configurations," "Assembly, Drives, and Cable." Also included are a parts list, reproduction of the component side of the unpopulated circuit board, picture of chip locations, and schematic of the circuit.

An optional plastic case was obtained from the vendor to give the controller a finished look. The case is the customary enclosure used to house the standard Radio Shack controller.

Obtaining Parts

The RDC-1 must be populated with components obtained by the purchaser from other sources. F & D Associates sells the floppy disk controller chip, the Disk Extended Basic ROM, and the plastic case to simplify the purchaser's task. All other components — resistors, capacitors, sockets, jumpers, crystal, and other integrated circuits — are available from electronic parts outlets. The cost of these parts was above the minimum required to make a mail order, so I elected to buy from a mail-order house. Not all parts were in stock. I had to shop around for the remaining parts because the remaining cost did not meet the minimum order threshold.

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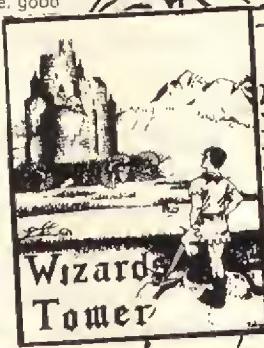
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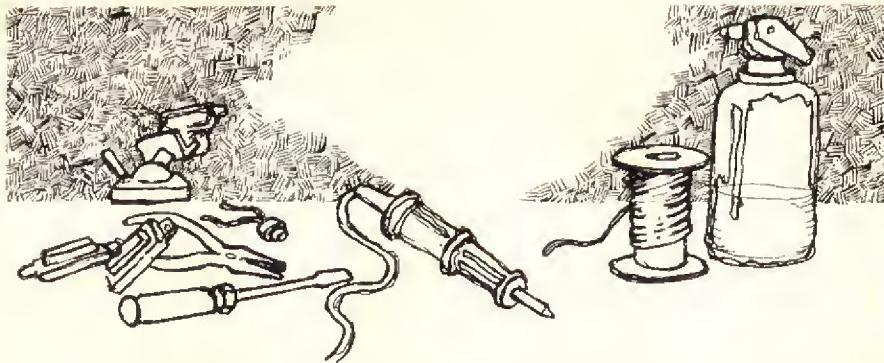
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Cost

Table 1 summarizes the typical cost of an assembled disk controller. The cost as listed presumes that the builder already owns the Extended Basic ROM. This ROM is a prerequisite to upgrading to the disk operating system. (It is different from the Disk Extended Basic ROM, which performs disk I/O). Use of a blank "disk" ROM for special applications would reduce the total cost by as much as \$27 but would not allow use of the Radio Shack disk I/O routines. Use of an assembly service would add about \$25 to the cost.

The reader may observe that the total cost is less than the cost of an assembled, discounted Radio Shack disk controller — currently sold for about \$180.

Parts List	
COST	ITEM
49.50	RDC-1 board, manual, and SMC9216B
30.00	FDC1793 controller chip
35.00	Disk Extended Basic ROM
7.50	plastic case
16.00	additional components
3.00	shipping and handling
141.00	TOTAL COST



Options and Assembly

Before assembling the RDC-1, the builder must decide what board options will be used. The RDC-1 allows considerable flexibility in the selection of the disk ROM to be used. Choices are a 2716, 2532, 2732, MCM68764, 2764, or 27128. You must also choose among controller chips: an FDC1797 controller chip with side select and four drives, an FDC1793 with four drives and no side select, or an FDC1793 with three drives that uses the fourth drive select line as a side select line. Options are installed by cutting traces or soldering jumpers. The board is initially configured for full compatibility with the Radio Shack product, that is, an FDC 1793 with four drives.

Assembly time by the reviewer was under three hours. This included time to investigate unclear component locations. Herein lies a weakness in the documentation: the manual is actually a 1 to 1 photocopy scale reproduction of the component side of the board. Clarity is low. Locating parts is accomplished by visual pattern matching. There are no lithographed symbols on the board. The small size of traces and solder points on the photocopy requires careful concentration. In some cases there is a need to correlate locations with the schematic diagram.

The reviewer strongly recommends using IC sockets. It is best to install the sockets before any of the bypass capacitors are in place, otherwise, space con-

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flicts may occur. Only one other special precaution is suggested: because there is no diagram of the solder side of the printed circuit board, the builder should study the location of each tracing bridge before soldering a component. Once a component is installed, differentiating an erroneous bridge from an intended bridge is very difficult. The remaining assembly process is simple.

Recommendations

The suggestions listed below were sent to F & D Associates for comment. Their response may be found in the last section of this review.

1. To reduce confusion, change the reference to "install the electrolytic capacitor" to "install the tantalum capacitor."

2. Add the tantalum capacitor to the schematic diagram.

3. Provide a diagram of the foil side of the printed circuit board. Include a shadow image of the components. This will help to identify intended solder bridges and to allow a check for component placement.

4. Correct the placement of the disk capacitor near the 7406 in the center of

the board. It should be connected to the tracing next to Pin 14, not at Pin 14.

5. Improve the quality of reproduction of the manual.

6. Installation instructions should suggest that IC sockets should be soldered before disk capacitors.

7. Description of the wiring option for J11 is in error. The corrected text should read: "J10 should be installed. J9 should not be."

8. Allow the purchaser the option to buy gold contacts for the edge connector pins. Gold overlays, such as El-Fab's Finger-Pac (tm), are a suitable choice as they may be soldered over the existing tinned contacts.

Conclusions

I rank the RDC-1 "fair" for the assembly process because of minimal instructions and poor pictorials. (It is expected that the vendor will take note of these deficiencies and correct them by the time you read this article.) However, in terms of performance, the RDC-1 receives the rank of "highest marks." I have used the RDC-1 with the Flex operating system and with the Radio Shack Disk Operating System. It functions perfectly with single density, double density, and double-sided disk.

Ordering the RDC-1

The disk controller board and critical parts may be purchased from: F & D Associates, 1210 Todd Road, New Plymouth, OH 45653. Inquiries may be directed to Dave Weeks at (614)592-5721.

Response From the Vendor

Comments about this article were solicited from Mr. Weeks in the hopes that a written response would be of general benefit. These hopes have been realized. The following reply from Mr. Weeks is presented without abridgment or editing:

"Mr. Grunby has some good points—we are correcting and improving the documentation where necessary."

"A fairly large number of these boards have been sold and we have many reports of successful assembly and operation. All the comments have been positive so far. Only one person has reported that the board did not work on the first try. Even though we solicit comments on the documentation package, Mr. Grunby is the first to offer any."

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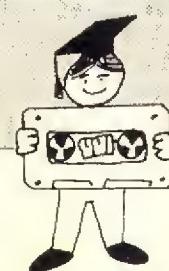
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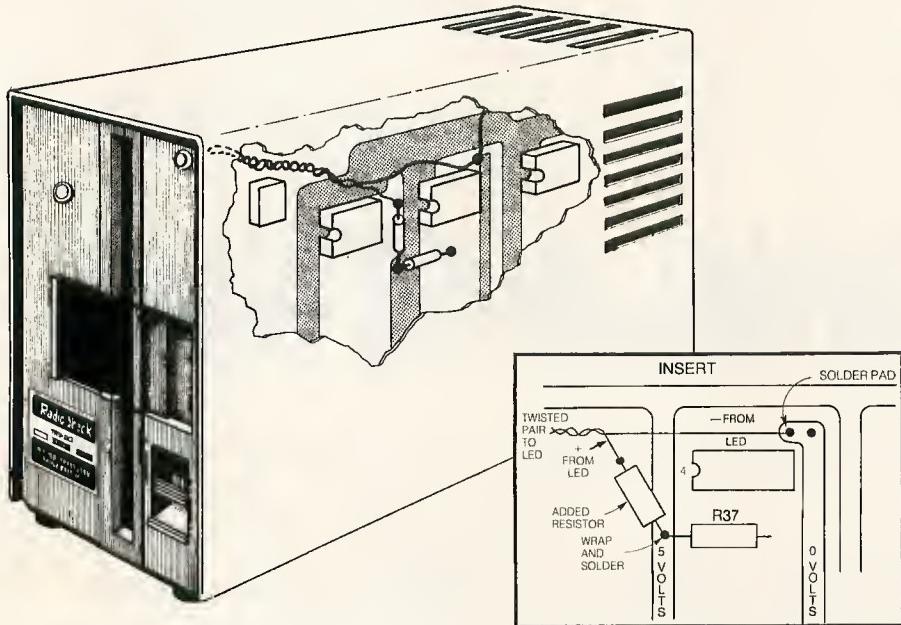


Figure 1. PC board close-up and insert for on/off light modification.

WHY DIDN'T RADIO SHACK include an on/off light on the Color Computer disk drive? They should have; I've left mine on overnight too often. Fortunately, some very minor surgery can cure this shortcoming. In fact, for less than \$1 and 30 minutes of your time, you can add a simple on/off indicator.

When I opened the drive and surveyed the situation, I was led to one conclusion: If I wanted to add an indicator, I'd have to drill a hole in the front panel.

Stop reading now if you don't want to take that step.

Case Removal and Preparation

First unplug the disk drive cables and unscrew the four cross-head screws on the outside of the case. Position the drive in front of you in its upright position, pointing the front of the drive to the left. Now compare the printed circuit board

to Figure 1: Locate TP1, integrated circuits 1,3,4 and 10. The IC labels are stamped on the PC board without the usual U suffix. Locate R37, and the zero and five-volt buses, also labeled on the PC board. Locate the solder pad to the upper right of IC 4. Look now at the upper inside corner of the disk drive front panel; there is a rectangular boxed area which is where the LED indicator will be installed.

The only parts required are a resistor and an LED. Since I didn't want to drill a large hole, I settled for a miniature red LED like Radio Shack's part number 276-026. You can choose whatever suits your fancy; there are even LED's that blink automatically. However, choose a current-limiting resistor to match. Choose its value using this formula:

$$R = 3000/I$$

where:

R = the resistance in ohms

I = the LED current in millamps

The numerator value is $1000 * (5 \text{ volt supply LED voltage drop})$. For an LED requiring 20 millamps, the required resistance value is 150 ohms. A half-watt resistor has large enough heat dissipation for this application.

Installation

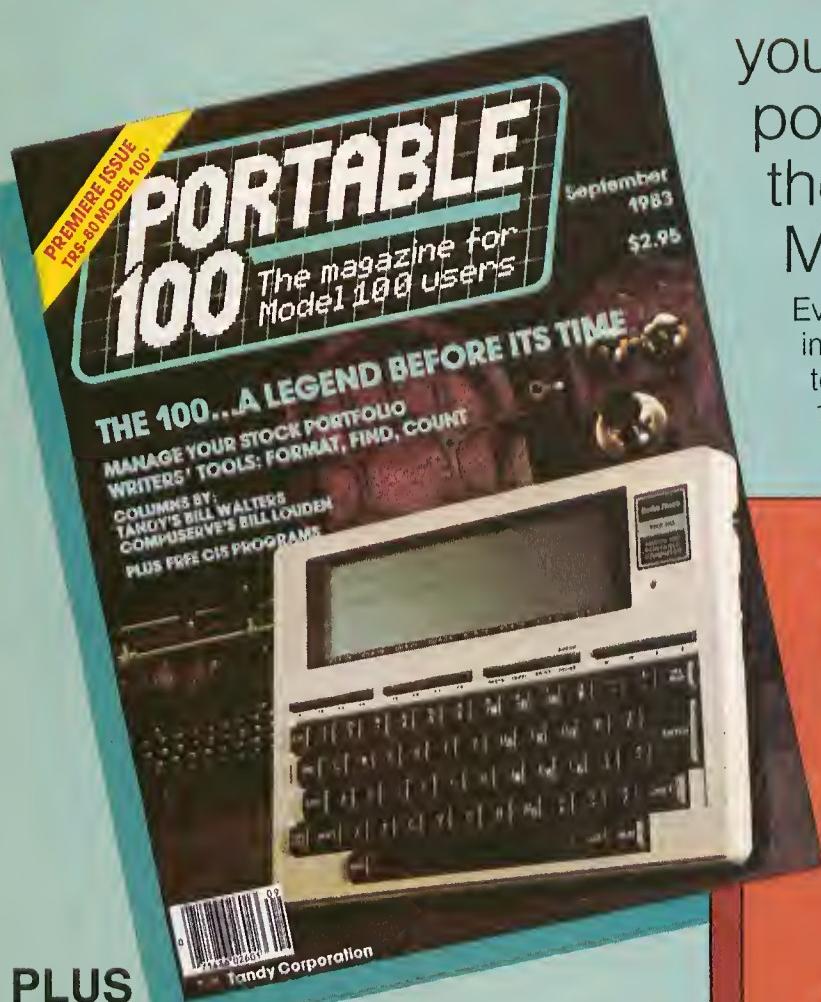
Refer to Figure 1 and its insert, and determine the size mounting hole required. Place a piece of tape over the rectangular box behind where the hole is to be drilled; this will keep drill chads out of your drive. Twist a pair of 8 inch wire lengths together, and solder one to each side of the LED. Refer to the LED package to determine the plus side of the LED, then label the plus wire. Drill the hole, remove the tape and insert the LED. Tape the LED leads to prevent shorts.

Refer to the Figure 1 insert again. Solder the current-limiting resistor to R37 where R37 enters the 5 volt bus, using a short lead. Solder the positive lead from the LED to the other end of this current-limiting resistor. Solder the remaining wire to the solder pad as shown. Dress the twisted pair as shown and secure it with tape. Make sure the current-limiting resistor does not touch any other electrical connections.

To test the indicator, plug in the disk drive with the on/off switch off. Check the wiring again and if all is well, turn on the drive. The LED should light up. If not, recheck the wiring. If the wiring is correct, try reversing the leads to the LED. This should fix the problem. Unplug the drive, replace the case and hook the drive to the computer.

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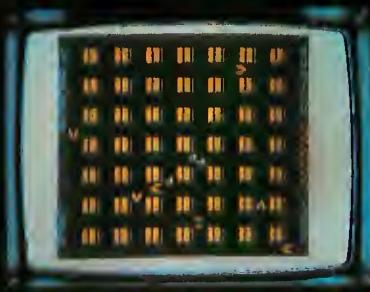
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A Grab-Bag of Reviews



WHAT HAPPENS WHEN you send a grab-bag assortment of things to review to a reviewer who swears his life during the time he set aside to review software was more like Dennis Kitsz's daily schedule than he imagines his own to be? You get a grab-bag assortment of reviews back, and we liked the mix so much we decided to leave it that way. If you detect any short temperedness in the following grab-bag, attribute it to the neighbor's steer, which found a new place in the fence to break through daily... (—Eds.)

by R.W. Odlin

Software Round-up

After the stimulating experience of frying my motherboard, I start this piece with eight shiny new 64K chips on a board explicitly labelled "64K" — Telewriter-64 now tells me the memory buffer contains 36K — and a 90-day wait before I can put the good keyboard back in. Fortunately, none of these programs calls for any heavy-duty typing. (One of

them is no program at all, but a joystick enhancement.) Let us take them alphabetically:

AREX

Adventure International
P.O. Box 3435
Longwood, FL 32750
16K
\$34.95 cassette

AREX IS THE MOST flossily-packaged of the programs under review, with a molded plastic folder and an expensively-printed manual (far too full of capital letters and exclamation marks, though) with clear and explicit instructions. It offers extreme difficulty in a variation on the Worm-type games which

were popular a year or so back. All sorts of things are bounding about the screen about to get you, and you are trying to secure as much of the screen as you can by extruding a wall behind you. It is quite ingeniously written, but its graphics are not very pleasant (on my set-up, the display kept flickering between color and black and white, but this may not be the program's fault).

The user has a choice of joysticks or keyboard (the joystick offers a slightly swifter response, it may be). If you halt for more than five seconds, a Rippler, or "lit-fuse" effect, eats up your back-trail. When it reaches your ship, the Rippler destroys it. Higher-level screens contain various obstacle patterns distinguished from your wall by their color, and these make it more difficult to safely fill the screen.

On first loading I thought the main side of the cassette was blank, and found the back-up on the flip side impossible to load. It turns out that the copy on side one is at least five minutes into the tape. Since the program employs no protection schemes, it is quite easy to put a new copy nearer the beginning of the tape.

Babylon

Valhalla Enterprises
P.O. Box 243
Sumner, WA 98290
16K Non-Extended Basic
cassette

THIS GAME IS A DISGUISED arithmetic-drill, but the disguise is remarkably pleasant. The supposition is that you are king of a small Babylonian town, trying to balance food supplies, defenses and population. The monthly progress reports are couched in a kind of cheery sarcasm which is very nearly irresistible over the short haul.

There are no graphics in this game, but it is not quite an adventure either, as these categories are understood. The user must be familiar enough with mathematical operations to enjoy such games as Monopoly before he will get much out of this one.

There is one small irritation: although the grain supplies are measured in bushels and the land in acres, the approach of the enemy is stated in kilometers. This draws unwelcome attention to the question of weights and measures, which we took for granted up to that point. I do not know what system was used in Babylon (shekels and such-like things, more than likely), but whatever it was, it was not to the base ten — the chances are the base was 360, as in the

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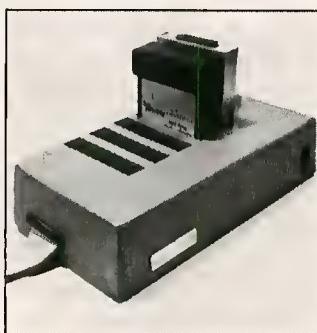


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compass we inherit from their Master Mariners — and to introduce a conflicting convention in the midst of the game is to partially destroy the sort of semi-belief we lend these games while they are in progress.

Beyond The Cimeeon Moon

ColorQuest, a division of Softlaw
9072 Lyndale Avenue So.

Minneapolis, MN 55429
16K ML, keyboard only

\$24.95 cassette \$29.95 32K disk

THIS GAME IS BILLED as a sequel to "Adventure Trilogy," and shares with that trilogy an extreme and unrelenting difficulty for all but the hardest-core game enthusiasts.

You are trying to amass weapons and shields to secure your freedom from an alien space ship on which you have been imprisoned. The ship is booby-trapped at every turn, and nothing is easily identified: for instance, the first two objects you are likely to encounter are a shield belt (TAKE it and WEAR it) and a mauler rifle (TAKE it and HOLD it).

It must be an open secret that review copies come with a "cheat sheet" in the form of a map of the ship with all the useful objects labelled and located. Even that is not much help against the random patrols and one-way doors with which the vessel is infested. I have gone almost nowhere and seen almost nothing in several hours of play. Once killed you start all over. I started all over a lot.

I really like the graphic convention invented for this series of games or adventures (a further example is the recently-released "Fembots' Revenge"), but it has one short-coming: keyboard entry of commands shows up on the screen with a noticeable delay — a delay long enough to occasionally get me killed.

There are two error messages: UNKNOWN COMMAND, which means just that, and OOPIE!, which means you have entered a valid command in the wrong situation. Neither helps much in your quest for freedom, but then if the door was shown to you outright there wouldn't be much fun in escaping, would there? It should be mentioned, however, that the loading instructions are wrong. They tell you to type LOADM, which will get you nowhere. A look at the directory reveals that LOADM.WORLD should be typed (it works).

The above may suggest that the game is impossible to win. My 14-year-old came home from his grandmother's, spent two hours getting killed again and again to find all the things he would need

(and identify certain crucial mistakes on the "cheat sheet"), and then started anew and escaped in one minute forty-four seconds (the program keeps track). He will be allowed out of his room in December, 1989.

Musical Lights

Zeta Software
P.O. Box 3522
Greenville, SC 29608
\$7.95 4K cassette,
\$14.95 16K cassette

THIS PRODUCT IS much more interesting than you would first suppose. All it does is present a sort of light-show, a screenful of graphics changing in time to what it hears from your cassette deck. The fascination is that you have total control, by one-stroke keyboard commands, over the elements of the display, and (at least in the 16K version) it implements all the semi-graphic modes the Color Computer has to offer. The sound you hear is as good as your TV allows, too, and that is a pleasant surprise, because it might have been filtered through the Color Computer's circuitry and come out as shaggy as most computer "music."

The commands let you toggle between monochrome (M) or color display, change the character (C) code displayed, take a faster (F) or slower (S) sampling rate, pause (P) and unpause (UP); 0 gives you semographics 4, 1 semographics 6, 7 PMODE 1, 8 PMODE 3, and so forth. The background color changes in response to another command. You can single-step through the display or stop to print the screen on a line printer. Total flexibility: the commands listed here are merely a sampling.

Spectrum Starblaster

Spectrum Projects
93-15 86th Drive
Woodhaven, NY 11421
\$14.95

THIS IS THE ONLY hardware item up for review, and it is such a small one I thought we might include it without offense. It really does what it claims: turns the firing button on your joystick into a rapid-fire button. It plugs into the joystick socket on the computer, and the joystick in turn is plugged into it. In appearance it is a small box with a dial on top; by turning the dial you set the speed of your repeat shots. But it may be less useful than it might seem, because half the trick of most games in which it is useful involves evading things fired at you.

Starship Hercules

Aardvark Ltd.
2352 S. Commerce
Walled Lake, MI 48088
\$24.95 Cassette, \$29.95 disk, 32K

THIS IS A BIG slow Star Trek variant, and if you like this sort of thing, this is the sort of thing you will like. Even with 32K to spread out in, it requires user entry of the PCLEAR POKE before loading (POKE25,6:NEW).

The program features a "view-port" type display of the scene of action, and several auxiliary screens of data, maps and read-outs. The premise is that your massive starship Hercules has been sent to the interstellar buffer zone to intercept a fleet of Zargon battle cruisers. The buffer zone consists of 16 major regions, each subdivided into four quadrants. There are 25 mobile starbases. Your ship is fitted out with shields, phasers, photon torpedoes, a library computer, and all the rest of the expected paraphernalia. You can see why I called it big, and since it keeps track of all this from Basic it is even slower than you might suppose. The manual covers 30 pages.

Zeus

Aardvark Ltd.
2352 S. Commerce
Walled Lake, MI 48088
16K ML, Joysticks only
\$19.95 cassette
\$29.95 disk

WHAT FOLLOWS IS THE unaided effort of my eleven-year old, a more sympathetic description than I could achieve:

"If you thought fooling with Mother Nature was fun, then try fooling with Zeus. Zeus (for untold reasons) is mad at you. You (the mighty sorcerer) must use your magic staff to shoot the angry god's lightning bolts. The staff, however, must occasionally rest to build up power. You also have a shield that can save you if a lightning bolt gets on the same level as you. If you're looking for a hard, machine language game with high-res graphics and excellent sound effects, this is it."

At higher levels of play the very clouds shoot lightning, but neither of my sons has risen above level 13 yet, and what further surprises may be in store remain undisclosed.

The program is copy-protected at both ends, with an auto-start module at one end and a booby-trapped Reset key at the other.

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Cruncher



```

10 X=256 PEEK(27) PEEK(28)-429
20 FOR I=X+428:READ A$:VAL
H"+A$):POKE I,A:B=B+A:NEXT
30 DA 44,59,C5,,8C,FA,,1,49
,FF,1,,C6,3,BD,A5,9A,8E,1,41
40 DATA 6F,1D,6C,,8C,9,EF,81
,33,4F,EF,1,6F,5,39,81,E3,25,3
50 DATA B2,77,8E,1,,80,E1,7E
,AD,D4,BD,B2,6A,86,4,97,,BD
60 B7,3D,,32,61,BD,B2,6
D,A,7D,26,F2,BD,B7,3D,9F,43,35
70 DATA 16,DD,42,D7,45,BD,B2,67,1
F,10,C6,20,3D,D3,BA,1F,3,1F,10
80 DATA 1F,98,C6,2,D7,7E,5F,4D
,8,80,C6,10,80,8,2B,3,5C,2
DATA F9,8B,8,44,1F,2,8E,0,11
51,F,50,1F,31,DC,BA,C3,17,E
0 DATA FD,1,DA,1F,20,BC,1,DA
,39,3A,E6,84,C1,FF,27,35,4F
0 DATA 5,58,58,4A,26,FB,C4,
C0,27,24,1F,20,D,50,2B,F,2
0 DATA D7,50,D1,51,24,10,5
F,2,20,C4,D1,52,26,1,39
DATA 20,F3,D6,50,3,50,
4D,27,4D,8190327,49

```

Wouldn't it be nice to have a program that automatically gets rid of extra spaces, remarks, and extra letters in variables?

WE OFTEN WISH that we could have the best of two worlds. Computer people are no different—dreams of programs that are easy to write, debug, and understand, yet are fast, efficient, and compact always seem to crowd our thoughts. I decided to investigate what I could do to improve the situation for the Color Computer...

Enter Program Listing 1. When I ran this program on my Color Computer, TIMER was 520. The available memory was 24703.

Now, run this program:

```

10 TIMER=0
20 FOR I=1 TO 1000
70 NEXT I
80 PRINT "MEM = " & MEM & " TIMER = " & TIMER
90 END

```

This should produce a rather large change in execution time. My computer produced a value for TIMER of 120! The second value for MEM was 24800, a reduction in size of 93 bytes, or over half the memory used by the original program.

If you suspect this program is not a fair example of speeding up and reducing a Basic program's memory use, you are

by William Harris



16K



or
Extended Basic

right. I wrote this program to specifically illustrate something, and its only purpose is shock value. Obviously, I took out all the REMs and changed VARIABLE to I. Perhaps less obviously, I took out all the spaces.

What Basic Is

Basic usually comes with the computer you own. The Color Computer comes equipped with Color Basic, Extended Color Basic, or Disk Basic. Basic is an easy language to learn. Basic is a forgiving language. If you do something wrong, it will tell you in no uncertain terms. Basic is also fairly easy to debug.

Basic is an interpreted language. An interpreter is a program that acts as an intermediary between you and your computer. The Basic interpreter takes a Basic command and determines what should be done and how to do it. Interpreted language has advantages and disadvantages. Basic has one overwhelming disadvantage: It is slow.

What I Did

To speed Basic up, I took some of the work away from it. Look at Line 20. Certainly no one would use a name like ANYVARIABLE for a variable name. Replacing this name with I saves Basic the task of wading through 11 characters each time through the loop.

I also deleted REM statements. Every time you use a remark, Basic has to look at it and then decide to ignore it. If you delete the remarks, you can reduce memory requirements by almost half!

Likewise, extra spaces in the program waste memory and take more time for execution than is necessary.

Countless computer magazines give you 10 pages of programs containing lines like:

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COLORSOFT MANAGEMENT SKILLS SERIES I: BEING BOSS

"BEING BOSS" is a collection of six programs and is the first in an ongoing series of computer assisted management development tools. Those who can benefit include corporate executives, managers, heads of teams, group leaders, supervisors, foremen, teachers, and parents. In fact, anyone who must take a leadership role can benefit from these programs.

- A. REFLECTIONS - a self evaluation guide
- B. ASSERTIVENESS - taking control as a leader
- C. MANAGEMENT STYLES - how to approach the leadership role
- D. DECISION MAKING - how to handle decision making
- E. COUNSELING - helping others solve personal problems
- F. STRESS CONTROL - taking care of yourself

Each program is in a multiple choice questionnaire format where the user is queried as to a response to a specified management situation. Tutorials help the user learn new management skills and insights. The programs include voice annotation from the author, Mr. Terry Barker. "BEING BOSS" is based in part on his forthcoming management books "BOSS TALK" and "THEORY C."

The series, "BEING BOSS", offers to the user the latest in management skill development concepts and should prove to be an invaluable TOOL for anyone who wishes to reach their full potential as a leader. The author has condensed week long intensive workshop material into this outstanding package. The accompanying user's manual is very well written and is easily understood by anyone.

Requires 16K and cassette.
PRICE: \$89.95

COLORSOFT™ ACCOUNTS RECEIVABLE

COLORSOFT™ Accounts Receivable is a full stand-alone accounts receivable system. It is also suited for integration into the COLORSOFT™ Small Business Accounting package. Accounts Receivable does not require the user to be an accountant; in fact, this is a highly user friendly system designed for daily use by the small businessman. The features and options of this system compare favorably with much higher priced software.

FEATURES

- *** PROVIDES ACCOUNT AUDIT TRAIL ***
- *** ACCOUNTS ARE CARRIED BY CUSTOMER ***
- *** USER FRIENDLY AND FULLY MENU DRIVEN ***
- *** PREPARES INVOICES AND MAILING LABELS ***
- *** USER DOES NOT NEED TO BE AN ACCOUNTANT ***
- *** DETAILED USER'S MANUAL WITH SAMPLE TRANSACTIONS ***
- *** MENU PROMPTS MAKE ENTRIES EASY, FAST, AND EFFICIENT ***

COLORSOFT™ Accounts Receivable provides the user with detailed audit trails and history files on all transactions by a customer. It also prepares invoices, mailing labels, aging lists, customer history reports, and an alphabetized customer listing. The user can define discount/net terms for commercial accounts and finance charge and minimum payments for revolving accounts.

Requires 16K and a Single Disk Drive.
PRICE: \$89.95

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```

190 POKE65495,0:FORL=0TO25:READL
$ :L$(L)=L$:NEXT :FORL=&H7F01TO&H7
FFF:READL$ :POKEL,VAL("&H"+L$):NE
XT:FORL=0TO19:READL$:MO$(L)=L$:N
EXT:PMODE3:PCLS2:PMODE4:GET(0,0)
-(7,7)MR,G:POKE65494,0:GOSUB810

```

This particular line would be terrible to debug. In fact, it contains a syntax error that may take you a few minutes to find. It would be so much easier if the data wasn't smashed together.

Your program will be virtually impossible to maintain if you have written it effi-

ciently, but if you write it so you can read it, your program will be hopelessly inefficient. One uncomfortable solution would be to save one copy to work on, and another copy without the remarks and spaces to run.

The Space Cruncher

The eagle-eyed among you have already spotted the assembly language listing. Type in the Basic loader preceding the assembly language listing and run it. Then whenever you have a program you

want to shorten or speed up, CLOAD your program, and then CLOADM and EXEC the machine language program the loader has created. It will automatically get rid of extra spaces, remarks, and extra letters in variables.

If a remark line is deleted by this program, any GOTOS in the Basic program originally directed to a now deleted line will produce a ?UL ERROR. The problem is easily resolved in one of two ways: Write your Basic program so you never GOTO REMs, or edit the GOTO so the program goes to the next line. ■■■

Program Listing 1. Sample Program

```

10 TIMER=0
20 FOR ANYVARIABLE=1 TO 1000
30 REM
40 REM THIS LOOP DOES NOTHING
50 REM IT IS JUST A SAMPLE LOOP
60 REM
70 NEXT ANYVARIABLE
80 PRINT "MEM=";MEM;" TIMER=";TI
MER
90 END
      ■■■

```

Program Listing 2. Basic Loader

```

10 S=PEEK(116)*256+PEEK(117)
20 S=S-427
30 CLEAR 4,S-1:RUN 40
40 S=PEEK(116)*256+PEEK(117)
50 S=S-427
60 C=0
70 FORI=0TO427
80 READ A
90 POKE S+I,A
100 C=C+A
110 NEXT I
120 IF C<>42377 THENPRINT"YOUR D
ATA STATEMENTS ARE IN     ERROR.
 PLEASE RECHECK THEM.":END
130 PRINT"PUT THE TAPE YOU WISH
 TO SAVE XCMPT ON IN YOUR TAPE R
ECORDER.  PRESS PLAY AND RECORD
 PRESS <ENTER> WHEN YOU
 ARE     READY TO CONTINUE"
140 IFINKEY$<>CHR$(13)THEN140
150 PRINT"SAVING MACHINE LANGUAG
E PROGRAM XCMPT":PRINT"START ADDR
ESS:   "S:PRINT"END ADDRESS:  "S
+427:PRINT"EXECUTION ADDRESS:  "
S

```

```

160 CSAVEM"XCMPT",S,S+427,S
170 PRINT"REMEMBER TO CLEAR 200,
"S-1
180 PRINT"BEFORE YOU CLOADM AND
EXEC THIS PROGRAM":END
190 DATA 142, 0, 25, 175, 141, 1
, 163, 220, 27, 131
200 DATA 0, 4, 221, 27, 158, 25,
156, 27, 16, 44
210 DATA 1, 111, 156, 27, 16, 44
, 1, 42, 51, 4
220 DATA 31, 50, 166, 192, 77, 1
6, 39, 0, 191, 129
230 DATA 130, 16, 39, 0, 185, 12
9, 131, 16, 39, 0
240 DATA 177, 129, 255, 16, 39,
0, 160, 129, 134, 16
250 DATA 39, 0, 128, 23, 0, 233,
16, 39, 0, 151
260 DATA 129, 32, 16, 39, 0, 147
, 129, 34, 39, 52
270 DATA 129, 38, 38, 12, 167, 1
60, 166, 192, 129, 72
280 DATA 39, 21, 129, 79, 39, 12
5, 23, 0, 167, 39
290 DATA 43, 37, 120, 129, 65, 3
7, 116, 129, 90, 34
300 DATA 112, 32, 41, 167, 160,
166, 192, 23, 0, 146
310 DATA 39, 247, 129, 65, 37, 1
64, 129, 70, 47, 239
320 DATA 32, 158, 167, 160, 166,
192, 39, 92, 129, 34
330 DATA 39, 79, 32, 244, 167, 1
60, 166, 192, 141, 116
340 DATA 38, 138, 39, 246, 167,
160, 166, 192, 129, 65
350 DATA 37, 7, 129, 90, 35, 9,
22, 255, 121, 141
      ↓ more

```

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COLORCOM/E, the most popular smart terminal program for the Color Computer, has just gotten smarter. In fact, from now on, we're going to call it The Intelligent Terminal program.

The new DISK COLORCOM/E contains a unique COMMAND MODE that allows you to set up complete communications sessions in advance. Anything you normally do from the keyboard DISK COLORCOM/E can do all by itself. Log-on, log-off, read and store messages, disconnect, transmit and receive files, dial auto-dial modems, — anything! DISK COLORCOM/E will even make decisions based upon how the host responds.

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- Call your favorite bulletin board, download all messages addressed to you, log off, and write the messages to a disk file. AND do all of this with one keystroke!
- Call Dow Jones, log on and get the latest prices on your favorite stocks, and then log off. Again all with ONE keystroke.
- With an Autodial modem let COLORCOM/E Make your calls for you at 3:00 A.M. when rates are cheap. Then read the results with your morning coffee.

In addition we've added 64K support and your choice of number of characters per line. Of course you still get the regular COLORCOM/E features such as upload/download, graphics, easy storing and printing of data, and much more. For 16, 32 or 64K disk systems.

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4

360 DATA 95, 16, 38, 255, 115, 1
67, 160, 166, 192, 16
370 DATA 39, 255, 107, 141, 114,
16, 39, 255, 101, 32
380 DATA 242, 167, 160, 166, 192
, 39, 33, 129, 58, 39
390 DATA 20, 129, 34, 38, 242, 1
67, 160, 166, 192, 39
400 DATA 19, 129, 34, 39, 232, 3
2, 244, 167, 160, 166
410 DATA 192, 167, 160, 166, 192
, 22, 255, 62, 49, 63
420 DATA 79, 167, 160, 52, 16, 4
9, 59, 16, 172, 225
430 DATA 39, 9, 175, 141, 0, 180
, 174, 132, 22, 255
440 DATA 27, 16, 174, 132, 174,
141, 0, 168, 16, 175
450 DATA 132, 31, 33, 22, 255, 1
2, 129, 46, 39, 8
460 DATA 129, 48, 37, 6, 129, 57
, 34, 2, 26, 4
470 DATA 57, 36, 35, 40, 41, 42,
43, 44, 45, 47
480 DATA 58, 59, 60, 61, 62, 63,
64, 94, 0, 52
490 DATA 16, 133, 128, 38, 13, 4
8, 140, 229, 109, 132
500 DATA 39, 10, 161, 128, 39, 2
, 32, 246, 26, 4
510 DATA 53, 144, 28, 251, 53, 1
44, 158, 25, 156, 27
520 DATA 44, 57, 51, 4, 166, 192
, 38, 252, 174, 132
530 DATA 156, 27, 44, 30, 239, 1
41, 0, 78, 31, 18
540 DATA 174, 132, 141, 48, 236,
161, 237, 193, 166, 160
550 DATA 167, 192, 166, 160, 167
, 192, 166, 160, 38, 250
560 DATA 167, 192, 32, 222, 79,
95, 239, 159, 1, 170
570 DATA 237, 193, 223, 27, 223,
29, 223, 31, 57, 158
580 DATA 25, 111, 128, 111, 128,
159, 27, 159, 29, 159
590 DATA 31, 57, 52, 118, 158, 2
5, 156, 27, 44, 14
600 DATA 16, 174, 132, 16, 172,
100, 38, 2, 239, 132
610 DATA 31, 33, 32, 238, 53, 24
6, 255, 0

Program Listing 3. *Cruncher*

COLOR COMPUTER SOFTWARE

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EDITOR ASSEMBLER DEBUGGER

\$695

**EDITOR
ASSEMBLER
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CCEAD: This 8K Basic Program supports cassette files, has full cursor control, line insertion/deletion, and much more. Two pass assembler supports full 6809 instruction set & addressing modes, lists to screen or printer. Debugger allows memory examine/modify, program execution. If not delighted return within 2 weeks for a full refund. You get fully commented Basic source & complete instructions. Requires Ext. Basic & 16K **CASSETTE \$6.95**

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2

00660 * &NNN WILL BE AN OCTAL CONSTANT.
 00670 * AND CAN BE CHECKED WITH THE OTHER NUMBERS
 00680 NUMBER LBSR BEQ BLO CMPA # A WAS CHAR IN RANGE A-Z?
 00690 GETNUM YES NUMCHK
 00700 IGNORE NO
 00710 *
 00720 *
 00730 * IF GREATER THAN 9, STILL MIGHT
 BE A VARIABLE, SO...
 00740 *

00750 * VARCHK: CHECKS FOR VARIABLE
 00760 *
 00770 VARCHK CMPA # A
 00780 BLO CMPA # Z
 00790 CMPA # 'Z
 00800 BRA
 00810 BRA
 00820 *
 00830 * GETHEX: CHECKS FOR VALID HEXADECIMAL NUMBERS AND
 00840 * SAVES THEM
 00850 *

00860 GETHEX STA Y+ SAVE LAST CHAR
 00870 LDA J+ GET NEXT CHAR
 00880 LBSR NUMCHK
 00890 BEQ GETHEX IT WAS ASSUME VALID PART OF
 00900 * HEXADECIMAL CONSTANT
 00910 CMPA # 'A-
 00920 BLO LINE
 00930 CMPA # F
 00940 BLE GETHEX IT IS IN RANGE OF A-F?
 00950 *
 00960 BRA LINE
 00970 *
 00980 * GETSTR: TAKES STRINGS AND PRESERVES THEM EXACTLY AS
 01000 * THEY ARE PRESENT IN MEMORY
 01010 *

01020 GETSTR STA Y+ SAVE CURRENT CHAR IN STRING
 01030 LDA U+ NEXTLN END OF LINE=END OF STRING
 01040 BEQ CMPA # "" QUOTE INDICATES STRING END
 01050 BRA NEXTLN STRING END-RESUME NORMAL LOOP
 01060 GETSTR STILL PART OF STRING
 01080 * GETNUM: CHECK FOR NUMERAL CONSTANTS AND IF THE
 01100 * CHARACTERS ARE NUMBERS, KEEPS THEM.
 01120 GETNUM STA Y+ SAVE NUMBER
 01130 LDA U+ GET NEXT CHAR
 01140 BSR NUMCHK
 01150 BNE LINE
 01160 BEQ GETNUM IT WAS A NUMBER
 01180 *
 01190 * REPEAT PROCESS
 01200 * GETVAR STA Y+ GET NEXT CHAR
 01210 * GETVAR CMPA # A
 01220 * GETVAR CMPA # 'Z
 01230 * GETVAR STA Y+ GET NEXT CHAR
 01240 LDA U+ CHECK FOR RANGE OF A-Z
 01250 CMPA # 'A
 01260 BLO CNUM
 01270 *
 01280 CMPA # 'Z
 01290 *
 01300 *
 01310 *
 01320 CNUM
 01330 LINE
 01340 *
 01350 * EATUP: DELETES ALL LETTERS FROM VARIABLES AFTER
 01370 *

004A 23 09 01290 *
 004B 16 FF79 01310 *
 0049 8D 5F 01320 CNUM
 004B 1026 FF73 01330 LINE
 01340 *
 01350 * EATUP:
 01360 * DELETES ALL LETTERS FROM VARIABLES AFTER
 01370 *

00AF A7 A0 01380 *
 00B1 A6 C0 01390 *
 01400 EATU1 STA Y+
 01410 LBEQ LDA U+
 01420 BSR LINE
 01430 LBEQ BRA EXIT
 01440 F2 01450 *
 01460 *
 01470 * DATA:
 01480 * SAVES ALL OF DATA LINES UP TO AND INCLUDING
 01490 * COLONS. CHECKS FOR STRINGS SO COLONS INSIDE
 01500 * QUOTES ARE IGNORED.
 01510 DATA STA Y+
 00C1 A6 C0 01520 LDA U+
 00C3 27 21 01530 BEQ NEXTLN
 00C5 81 3A 01540 COLON CMPA # :
 00C7 27 14 01550 BEQ NEXT
 00C9 81 22 01560 CMPA # !"
 00CB 26 F2 01570 BNE DATA
 00CD A7 A0 01580 OATSTR STA Y+
 00CF A6 C0 01590 LDA U+
 00D1 27 13 01600 BEQ NEXTLN
 00D3 81 22 01610 CMPA # !" END OF STRING?
 00D5 27 E8 01620 BRA DATA
 00D7 20 F4 01630 DATSTR MORE STRING
 01640 *
 01650 * NTRINS: TAKES CARE OF COLOR BASIC'S INTRINSIC TOKENS
 01660 *
 01670 NTRINS STA Y+
 00DB A6 C0 01680 LDA U+
 01690 *
 01700 NEXTLN STA Y+
 00DF A6 C0 01710 IGNORE LDA U+
 01720 *
 01730 *
 00E1 16 FF3E 01740 REVERS LBRA LINE
 00E4 31 3F 01750 LEAY -1,Y
 01760 *
 01770 * NEXTLN: STORES END OF LINE CHARACTER FOR BASIC,
 01780 *
 01790 *
 01800 *
 01810 NEXTLN CLR4 STX
 01820 STX PSHS X Y+
 01830 LEAY
 01840 CMPY -5,Y
 01850 E1 01860 *
 01870 BEQ DELIN
 01880 *
 01890 *
 00F2 AF 8D 00B4 01900 *
 00F6 AE 84 01910 LDX
 00FB 16 FF1B 01920 LBRA MAIN
 01930 *
 01940 * DELIN: DELETES CURRENT LINE
 01950 *
 00FB 10AE 84 01960 DELIN LDY
 00F6 AE 8D 00A8 01970 LDX
 0102 10AF 84 01980 STY
 01990 *
 02000 *

009A A7 A0 01950 *
 009C A6 C0 01960 DELIN LDY
 009E 81 41 01970 GET NEXT LINE ADDRESS
 01200 * GETVAR STA X,PCR
 01210 * GETNEXT PTR
 01220 * GETNEXT PTR
 01230 * GETNEXT PTR
 01240 * GETNEXT PTR
 01250 * GETNEXT PTR
 01260 * GETNEXT PTR
 01270 * GETNEXT PTR
 01280 * GETNEXT PTR
 01290 * GETNEXT PTR
 01300 * GETNEXT PTR
 01310 * GETNEXT PTR
 01320 * GETNEXT PTR
 01330 * GETNEXT PTR
 01340 * GETNEXT PTR
 01350 * GETNEXT PTR
 01360 * GETNEXT PTR
 01370 * GETNEXT PTR
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 01440 * GETNEXT PTR
 01450 * GETNEXT PTR
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 01470 * GETNEXT PTR
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 01490 * GETNEXT PTR
 01500 * GETNEXT PTR
 01510 * GETNEXT PTR
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 01530 * GETNEXT PTR
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 01950 * GETNEXT PTR
 01960 * GETNEXT PTR
 01970 * GETNEXT PTR
 01980 * GETNEXT PTR
 01990 * GETNEXT PTR
 02000 * GETNEXT PTR

VIP

TM

Library

ANNOUNCING The VIP Library™ With a Terrific Sale!

Nelson Software Systems is now Softlaw Corporation, under new management. Our Super "Color" Library programs have also undergone a name change. All programs are the same unbeatable Super "Color" Library programs you've heard so much about, but with new VIP names. To introduce our **VIP Library** we are having a special sale on the following pages. Our low prices for such high quality can't be beat so get started today!

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All **Library** programs are written in machine code specifically for the Color Computer, to work without the interference of a separate operating system such as FLEX. From this comes speed and more workspace for you. **Library** programs work perfectly with every Color Computer, from 16 to 54K. The most advanced hardware and software techniques are used to place programs in rompak cartridges for instant loading and total workspace with any Color Computer.

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The programs do not depend on BASIC, and so allow total compatibility and workspace with any size Color Computer, even 64K. Unlike other programs for the Color Computer which are said to be 64K compatible, **VIP Library™** programs are not limited to between 24 and 30K of workspace in 64K. **Library** programs have Memory Sense with BANK SWITCHING to fully use all 64K, thus giving an astounding 61K of workspace with the rompak cartridge, and up to 51K with a disk version!

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State-of-the-Art graphics allow instant use of four display colors, and eight lowercase displays featuring descending lowercase letters. You can select from 51, 64 or 85 columns by 21 or 24 lines per screen, with wide or narrow characters in the 64 display. These screens provide a pleasant and relaxing way to perform your tasks, with as much text on the

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screen as is possible. Each program is easy to learn and a joy to use. We take pride in the stringent testing done to make these programs perform flawlessly. Every feature, every convenience, sleek, simple and elegant.

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All **Library** programs are compatible. Transfer and use of files between programs is easy and carefree. What's better, when you have learned one program the others will come easy. And every program is the best of its kind available.

The Library Programs

For your writing needs is the **VIP Writer™**, and its spelling checker, the **VIP Speller™**. For financial planning and mathematical calculations you can use the **VIP Calc™**. To manage your information and send multiple mailings there is the **VIP Database™**. For sending all these files to and from home or the office and for talking to your friends you can have the **VIP Terminal™**. Finally, to fix disks to keep all your **Library** files in good repair we offer the **VIP Disk-ZAP™**.

Mini Disk Operating System

The Disk versions each have a Mini Disk Operating System which will masterfully handle from 1 to 4 drives. It offers smooth operation for such features as the ability to read a directory, display free space on the disk, kill files, save and automatically verify files, and load, rename and append files. **Library** programs simply do not have the limitations of BASIC.

Professionalism

The **Library** comes handsomely bound in gold-embossed, padded leatherette binders to grace your work area with the professionalism it deserves. Welcome the **VIP Library™** into your home and office.

A description of each of the **Library** programs, with the special sale price, is contained in the following pages. Please indulge!

VIP Writer™

(Formerly Super "Color" Writer II)

By Tim Nelson

RATED TOPS IN RAINBOW, HOT COCO, COLOR COMPUTER MAGAZINE AND BASIC COMPUTING The Official Dragon Microcomputer Word Processor™

The most powerful and easy-to-use word processor is available in the showpiece and workhorse of the Library: The VIP Writer™. Because of its undisputed superiority over all Color Computer word processors, it was selected by Dragon Data Ltd. of England to be the Official Word Processor for its line of Dragon microcomputers.

The result of two years of research, the VIP Writer™ offers every feature you could desire from a word processor. It is the most powerful, fastest, most dependable and most versatile. With the display, workspace and compatibility features built into the Library the Writer is also the most usable.

"... Nearly every feature and option possible to implement on the Color Computer. The design of the program is excellent; the programming is flawless... Features for the professional, yet it is easy enough for newcomers to master... Certainly one of the best word processors available for any computer..." October 1983 "Rainbow"

The Writer will work with you and your printer to do things you always wanted to do. Every feature of your printer can be put to use, every character set, every graphics capability at any baud rate, EVEN PROPORTIONAL SPACING. All this with simplicity and elegance.

Although all versions feature tape save and load, the disk version provides the Mini Disk Operating System common to the whole Library, plus disk file linking for continuous printing.

Professional features of particular note:

- Memory-Sense with BANK SWITCHING to fully utilize 64K, giving not just 24 or 30K, but up to 61K of workspace with the RomPak version and 50K with the disk version.
- TRUE FORMAT WINDOW to EXACTLY replicate the printed page ON THE SCREEN BEFORE PRINTING, showing centered line headers, FOOTNOTES, page breaks, page numbers, & margins in line lengths of up to 240 characters. It makes HYPHENATION a snap.
- A TRUE EDITING WINDOW in all 9 display modes for those extra wide reports and graphs (up to 240 columns!).
- FREEDOM to embed any number of PRINTER CONTROL CODES anywhere, EVEN WITHIN JUSTIFIED TEXT.
- Full 4-way cursor control, sophisticated edit commands, the ability to edit any BASIC program or ASCII textfile, SEVEN DELETE FUNCTIONS, LINE INSERT, LOCATE AND CHANGE, wild card locate, up to TEN SIMULTANEOUS block manipulations, word wrap around, programmable tabs, display memory used and left, non-breakable space, and headers, footers and FOOTNOTES.
- The ability to control ANY PRINTER, using dynamic text formatting with 27 comprehensive format parameters.
- Automatic justification, automatic pagination, automatic centering, automatic flush right, underlining, superscripts, subscripts, pause print, single-sheet pause, and print comments.
- Type-ahead, typematic key repeat and key beep for the pros, ERROR DETECTION and UNDO MISTAKE features, 3 PROGRAM-MABLE functions, auto phrase insert, column creation, an instant HELP TABLE, and a 110 page, fully indexed tutorial.

16K ROMPAK \$59.95

32K DISK \$59.95

* Sold as the Dragon Writer™ ONLY by Dragon Data Ltd. and its distributors.

VIP Speller™

(Formerly Super "Color" Speller)

THE WRITER'S ESSENTIAL COMPANION

Spelling checkers are an invaluable aid to every writer. Habitual misspellings and typos can be found without the eyestrain, boredom and fatigue associated with endless proofreading. The VIP Speller™ is a fast, machine-code proofreading program to correct any VIP Library™ or other ASCII file. It automatically proofreads your documents against a 20,000 word stock dictionary, plus your own customized dictionary and corrects typos or marks them for special attention.

DISK ONLY \$49.95

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Library

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TRUE VISICALC™ POWER!

By Kevin Herrboldt

- * UP TO 5 TIMES THE SCREEN DISPLAY AREA OF OTHER SPREADSHEETS!
- * STATE OF THE ART LOWERCASE DISPLAYS
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- * LOCATE COMMAND TO FIND SPECIFIC NUMBERS, LABELS OR FORMULAS
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Both versions feature Tape save and load, but the disk version also has the Mini Disk Operating System of the entire Library.

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32K DISK \$59.95

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- Four Different Display Colors
- 16, 32 & 64K Compatible
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- Mini Disk Operating System
- Compatible With All Printers

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VIP Terminal™

(Formerly Super "Color" Terminal)

THE FINEST TERMINAL PROGRAM ANYWHERE!

By Dan Nelson

From your home or office you can join the communication revolution. The VIP Terminal™ opens the world to you. You can monitor your investments with the Dow Jones Information Service, or broaden your horizons with The Source or Compuserve, bulletin boards, other computers, even the mainframe at work.

Picture getting your instantaneous investment report, incorporating it in your spreadsheet calculation, generating a report, and writing a memo incorporating that report and data from your database, all with **Library** programs. Then you can transmit the report to work, or wherever, long distance. The VIP Terminal™ will become the hub of your **Library**.

FEATURES: Memory-Sense with BANK SWITCHING for full use of workspace, from 16 to 64K * Selectively print data at baud rates from 110 to 9600 * Full 128 character ASCII keyboard * Automatic graphic mode * Word mode (word wrap) for unbroken words * Send and receive **Library** files, Machine Language & BASIC programs * Set communications baud rate from 110 to 9600, Duplex: Half/ Full/Echo, Word length: 7 or 8, Parity: Odd/Even or None, Stop Bits: 1-9 * Local linefeeds to screen * Save and load ASCII files, Machine Code & BASIC programs * Lowercase masking * 16 Keystroke Multiplier (MACRO) buffers to perform repetitive pre-entry log-on tasks and send short messages * Programmable prompt or delay for send next line * Selectable character trapping * Send up to ten short messages (KSMs), each up to 255 characters long, automatically, to save money when calling long distance.

All versions allow tape load and save of files and KSMs, but the disk version also has the Mini Disk Operating System common to the **Library**.

16K ROMPAK \$49.95

Disk version requires 32K for lowercase displays.

16K DISK \$49.95

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VIP Database™

(Formerly Super "Color" Database)

INCLUDES MAIL MERGE CAPABILITIES TOO!

By Tim Nelson

This high speed MACHINE LANGUAGE program fills all your information management needs, be they for your business or home. And it does so better than any other database program for the Color Computer, featuring machine code, lowercase screens and mailmerge capabilities. Inventory, accounts, mailing lists, family histories, you name it, the VIP Database™ will keep track of all your data, and it will sort and merge VIP Writer™ files.

The VIP Database™ features the Library Memory Sense with BANK SWITCHING and selectable lowercase displays for maximum utility. It will handle as many records as fit on your disk or disks. It is structured in a simple and easy to understand menu system with full prompting for easy operation. Your data is stored in records of your own design, each divided into up to 255 fields. Each field will hold up to 255 characters. All files are fully indexed for speed and efficiency. Full sort of records is provided for easy listing of names, figures, addresses, etc., in ascending or descending alphabetic or numeric order. You may also combine files, sort and print mailing lists, print "boiler plate" documents, automatically insert text in standardized forms, address envelopes - the list is endless. The math package even performs arithmetic operations and updates other fields. Create files compatible with the VIP Writer™ and VIP Terminal™. Up to five different print formats are available, and control codes may be imbedded for use with all printers.

As with all other **Library** programs, the **Database** features the powerful Mini Disk Operating System.

32K DISK \$59.95

VIP Disk-ZAP™

(Formerly Super "Color" Disk-ZAP)

RAVED ABOUT IN THE APRIL 1983 "RAINBOW!"

By Tim Nelson

Your database file disk, form letter disk, or BASIC program disk goes bad. An I/O error stops loading, or even backing up of the disk. Weeks, even months of work sit on the disk, irretrievable. Now catastrophic disk errors are repairable, quickly and with confidence, using the VIP Disk-ZAP™. It is the ultimate repair utility for simple and quick repair of all disk errors. Designed with the non-programmer in mind, the VIP Disk-ZAP™ will let you retrieve all types of bashed files, BASIC and Machine Code programs.

This high-speed machine code disk utility has a special dual cursor screen display to look at the data on your disk. You are able to: Verify or modify disk sectors at will * Type right onto the disk to change unwanted program names or prompts * Send sector contents to the printer * Search the entire disk for any grouping of characters * Copy sectors * Backup tracks or entire disks * Repair directory tracks and smashed disks * Full prompting to help you every step of the way * 50-plus page Operators Manual which teaches disk structure and repair.

16K DISK \$49.95

Lowercase displays not available with this program.



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All Disk Programs are also available on 3" Diskettes for the Amdek Color AMDISK-III Micro-Floppy Disk System for an additional \$3.00 each.

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Enter 24 on Tele Response page

```

0105 1F 21 02010 TER Y,X GET OLD LINE AS CURRENT LINE
0107 16 FF0C 02020 * LBR A MAIN
02030 * SUBROUTINE NUMCHK
02040 * ARGUMENTS : CHARACTER TO BE TESTED IN REGISTER A
02050 * RETURNS : ZERO FLAG IN CC REG IF NUMBER
                  PLUS FLAG IN CC IF GREATER THAN 9,
                  MINUS FLAG IN CC IF LESS THAN 0.
02110 *
010A 81 2E 02120 NUMCHK CMPA #'.
02130 BEQ NUMYES
02140 CMPA #'0
02150 BNW NUMNO
02160 CMPA #'9
02170 BHJ NUMND
02180 NUMYES ORCC #$04
02190 NUMNO RTS
0116 1A 04 02200 * SUBROUTINE SPTEST
02210 * SUBROUTINE SPTEST
02220 * ARGUMENTS : CHARACTER TO BE TESTED IN REGISTER A
02240 * RETURNS : ZERD FLAG SET IN CC IF CHAR WAS A
                  CHARACTER SPECIAL TO BASIC IN SOME WAY
02260 * ZERO FLAG RESET IF NOTHING SPECIAL
02280 * ABOUT CHAR IN REGISTER A
02290 * TABLE OF SPECIAL CHARACTERS
02300 * SPCHARS FCC I$#()*, -/:<=?@`-1
02310 SPCHARS FCC 02970 *
0119 242328292A2B 02310 SPCHARS FCC 02980 * SUBROUTINE ADJUST
2CD2FFA3B4C 03000 * ARGUMENTS : NEW ADDRESS OF LINE IN U
3D3E3FA05E 03010 * OLD ADDRESS IN X
03020 *
012A 00 02320 SPTEST PSHS 0 END OF TABLE
012B 34 00 02330 PSHS 0 SAVE REGISTER X
012C 85 80 02340 BNW $80 CHECK FOR BASIC TOKEN
012D 85 80 02350 BNW SPYES
012E 26 0D 02360 LEAX SPCHARS, PER START ADDR. OF TABLE
0131 30 8C E5 02370 SPLLOOP TEST ,X CHECK FOR END OF TABLE
0136 6D 84 02380 BEO SPND NO SPECIAL CHAR FOUND
0138 27 0A 02390 CMPA ,X+ IS REG A ONE OF THE CHARS
0139 81 80 02400 * BEQ SPYES
013A 27 02 02410 BRA SPLLOOP
013C 20 F6 02420 SPYES
013E 1A 04 02430 SPYES ORCC #$04
0140 35 90 02440 SPNO PULS X,PC
0142 1C FB 02450 SPNO ANDCC #$FB
0144 35 90 02460 PULS X,PC
02470 *****
02480 *
02490 * UPDATE : PHYSICALLY MOVES REMAINING PARTS OF
02500 * CRUNCHED BASIC PROGRAM DOWN IN MEMORY
02510 *
02520 *****
0146 9E 19 02530 UPDATE LDIX BEGIN FIRST LINE'S ADDRESS
0148 9C 1B 02540 CMPX LAST IF PROGRAM REDUCED TO NOTHING
02550 * RETURN IN MEMORY, RETURN TO BASIC
02560 BEJ GET START OF LINE
02570 LEAU 4,X
02580 UP02 LDA ,U+
02590 BNW UP02 SKIP FIRST LINE
02600 LDX ,X STILL MORE OF FIRST LINE
02610 * CNDENS : GO TO NEXT LINE
02620 * CNDENS : MOVES BASIC DOWN LINE BY LINE
02630 *
0154 9C 1B 02640 CNDENS CMPX LAST LAST LINE?
0156 2C 1E 02650 BGE EXIT YES
0158 EF 8D 004E 02660 STU SAVE ,PCR
00000 TOTAL ERRORS
00000 TOTAL ERRORS
015C 1F 12 02670 TFR X,Y
015E AE 84 02680 LDX X
0160 8D 30 02690 BSR ADJUST
02700 * * * * * 02700 * LDD STD
02710 C1 02720 STD
02730 A0 02740 STA
02740 A7 02750 LDA
02750 C0 02760 CN01
02770 A0 02780 LDA
02780 FA 02790 STA
02790 DE CN01
02800 EXIT CLRA
02810 CLRB
02820 STU
02830 STU
02840 STD
02850 STD
02860 * STU
02870 STU
02880 STU
02890 RT5
02900 RETURN LDX
02910 CLR X+
02920 CLR X+
02930 STX LAST
02940 STX LAST
02950 STX LAST
02960 RTS
02970 * * * * *
02980 * SUBROUTINE ADJUST
02990 * * * * *
03000 * ARGUMENTS : NEW ADDRESS OF LINE IN U
03010 * OLD ADDRESS IN X
03020 *
0192 34 76 03030 ADJUST PSHS X,Y,D,U SAVE REGS
0194 9E 19 03040 LDIX BEGIN GET FIRST LINE ADR.
0195 9C 1B 03050 ADLOOP CMPX END OF PROGRAM?
0198 2C 0E 03060 LDY ADEND
019A 10AE 84 03070 LDY X NO-CHECK NEXT LINE
019D 10AC 64 03080 CMPY 4,S COMPARE Y WITH VALUE OF STORED
019E 0090 * X REGISTER
01A0 26 02 03100 BNE ADPAST DOESN'T REFER TO THIS LINE
01A2 EF 84 03110 STU X,Y REPLACE WITH NEW LABEL
01A4 1F 21 03120 ADPAST TFR Y,X NEXT LINE
01A6 20 EE 03130 BRA ADLOOP
01A8 35 F6 03140 ADEND PULS X,Y,D,U,PC RESTORE REGS & RETURN
01AA 0000 RMB 03150 SAVE END
03160 00000 TEMPORARY STORAGE
00000 TOTAL ERRORS
00000 TOTAL ERRORS
01AB ADEND 01AB EXIT 0176
0192 ADJLOOP 0192 GETHX 0071
0196 LAST 0196 GETNUM 0090
01A4 ADPAST 01A4 GETSTR 0084
0199 BEGIN 0199 GETVAR 009A
016C CN01 016C HEXCH 0050
0154 CNDENS 0154 SPCHR 0119
01A9 CNUM 01A9 SPLOOP 0134
00C5 COLON 00C5 SPNO 0142
0022 LINE 0022 SPTEST 012B
0116 MAIN 0116 SPYES 013E
00DD DATA 00DD START 0000
00CD DASSTR 00CD SEARCH 004C
00FB DELIN 00FB UP02 014E
0081 EATL 0081 NTRINS 00D9
00AF EAUTP 00AF NUMBER 0060
010A NUMCHK 010A VARCHK 0067
  
```

OS-9 or FLEX

O-PAK: Hi-Res screen formats for RS OS-9, plus XCOPY utility to copy files from OS-9 to FLEX to RS DOS and vice versa!

For OS-9 \$34.95

A-BASIC: Produce fast compact, ROMable object code from easy to write BASIC source code.

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CRASMB: Use the MACRO cross assembler and any of the following CPU personality modules (CPM's) to assemble that CPU's source code into OS-9, FLEX, Motorola S1-S9 or Intel-HEX formatted Object code files. Available CPM's: Motorola 6800-2-8, 6801-3, 6805, 6809, MOSTEK 6502, RCA 1802, INTEL 8080-5, ZILOG Z-80.

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DYNASOFT PASCAL: This remarkable Pascal subset is a p-code implementation that only requires 12K of RAM. CoCo FLEX or OS-9 \$59.95

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This easy to use, "BASIC-like" Job Control Language is great for Batch processing.

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SUPER SLEUTH: Examine and modify or disassemble binary program files into source code format. Object code for 6800, 01, 02, 03, 05, 08, 09, or 6502 may be processed.

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CompuServe Connection

A look into a popular computing activity.



by Terry Kepner

WHO OR WHAT IS CompuServe? CompuServe is an information service available to computer and video terminal owners. Using CompuServe, you can book airline tickets for a trip; look up the latest information regarding FDA regulations; farmers can determine the cost break-even point of a crop; you can find current-date quotes on over 12,000 stocks and bonds; join a CB club; read reviews about the latest movies; or access any of the hundreds of other services, databases, and groups on-line in the CompuServe network.

CompuServe's services have enough variety (the index has over 700 entries) to keep you busy for many hours. The average user can spend several hours just looking things over and exploring the databases.

Ah! The Databases

The databases on CompuServe have hundreds of programs, and thousands of words of advice. If you like to trade programs you've written with other people, you'll love the selection available. If you're interested in how your computer works, the Special Interest Groups have the latest information, as well as the answers to almost all your questions. In fact, many times you can find the authors of major software and hardware packages on-line and answering questions from their customers. It's much more personal, and generally faster to describe your problem and get your solution direct from the author instead of from a store salesman.

If you have problems with equipment,

many times you can leave a message and have your problem solved by one of the many experts that are members of CompuServe (experts like Jake Commander, Ed Juge, Bill Walters, and Kim Watt, to name but a few). And almost all computer magazine staffs regularly scan the boards for messages and leave updated information about programs they've published. To try to list even a fraction of the services available would take up this entire article, and wouldn't even start to cover the various ways you can benefit from perusing the bulletin board systems (BBS for short).

All in all, most people find a CompuServe membership to be well worth the price, which is only \$6.00 an hour for non-prime time (i.e., after 6 p.m. and before 8 a.m.), plus whatever charges you

run up on your phone connection. If you're lucky enough to live in one of the 150-plus cities with a direct CompuServe link, you won't have to add long distance phone charges to your bill like I do ("only" \$.21 per minute where I am). Even if you don't live near a city with a CompuServe number, you might be able to tie on with a local number through the GTE, DataPac, Telenet, or Tymnet phone networks (which have hundreds of phone numbers all across the country); these do add a modest charge to your bill, though.

To use the service you'll need a Color Computer (or any other computer or terminal with an RS-232 port), modem, a cable to connect the two, some type of terminal software, a telephone, and a password for the CompuServe Information Service (or CIS, as it's known to its friends and users). The modem can be an acoustic or a direct-connect device. The acoustic type has two cups into which you place the telephone handset; the direct-connect device has a modular plug that you plug into the phone lines in place of your telephone. Which device you buy is up to you, although acoustic modems are usually less expensive. If you shop around you'll probably find an acoustic modem for less than \$100. As for software: the May 1983 issue of **The Color Computer Magazine** has a comparison of several terminal packages for the Color Computer.

If you decide to use Tandy's Videotex package, you automatically get your CompuServe user ID number and first password. Currently, the package costs \$29.95. If you use someone else's terminal package, you can get the CompuServe package from Radio Shack, sans software, for \$19.95.

Both packages give you the same CompuServe options and information. Along with your password and ID number, you get a brief instruction/introduction booklet to the CompuServe network, listing some of the services available, the CompuServe phone number network, instructions on how to sign on, and one hour of connect-time to CompuServe. At the end of the first hour, you're given a choice about how you like to be billed. If you have a Visa or Master Card, you can elect to have your charges billed to your card automatically every month. Otherwise, you will be billed directly. (Late payment will result in being "locked" off CompuServe until your bill is paid.)

Also included with each package is a Dow Jones password and ID number, with one hour of connect time credited to your account; payment is similar to CompuServe. Dow Jones puts you on

Wall Street, at the stock exchange, with only a 15 minute delay from the floor trade (to protect stock brokers, who get the information without a delay). You also have access to megabytes of information about the stocks, their past records, and the issuing companies.

Before calling any CIS number, make sure your modem is correctly set (on originate, and at full duplex). Make sure the software is set for 300 baud, seven-bit words, even parity, and one stop bit (you can also use eight-bit word length, no parity, and one stop bit).

When you first phone CompuServe, you must send a Control C command to the system. How to do this is explained in your terminal software instructions; it is usually done by holding the Down-Arrow key down while pressing the C key. The Control C command (CTRL C) is used by CompuServe to determine the baud rate your computer is transmitting (it's possible to tie on at 1200 baud with the proper modem and phone connection). Next you're prompted to enter your ID number, then your password.

With these formalities finished, you're on line. On your first call, you'll be requested to answer a few questions and to return the application in your CompuServe package. Then you'll be ready to use the system.

CompuServe is a menu-driven system, and you start with page one (CIS-1, see Figure 1). As you can see, the display is 16 lines by 32 columns, an exact match for the Color Computer! This is the way the entire service is set up, in pages of 16 lines by 32 columns. Some areas deviate from this standard, but I'll warn you about them as we go along.

Paging Along

You travel from one menu in the system to another until you reach the information or service for which you're searching. You can also use specific commands to maneuver through the system without bothering to use the menus. This is faster, but requires some skill, as it's easy to get lost.

The commands for this direct maneuvering are simple: T returns you to the top of the CompuServe network, page CIS-1; M moves you to the previous menu; F moves you forward one page; B moves you back one page; H gets you helpful information; R resends the current page; GOxxx goes directly to the area specified by xxx; EXI exits the videotex area; OFF or BYE immediately logs you off the system and disconnects the phone line. There are other commands, but the instruction booklet explains them all, so I've only mentioned the most commonly used commands.

To use these commands you must be at a CompuServe prompt character !. When you're at this prompt, you can move anywhere in the system with the appropriate command. Pressing the Enter key without giving a command will move you to the next page in the series. If you're at the last page in a particular section, Enter will return to the menu for that section. If you want the information flow to stop for a moment, press CTRL-P. To restart it, press CTRL-Q.

DEFALT

One of the first things you'll want to do on the service is customize your ter-

Figure 1. Page 1 Display: CIS-1

COMPUSERVE	PAGE CIS-1
COMPUSERVE INFORMATION SERVICE	
1. HOME SERVICES	
2. BUSINESS & FINANCIAL	
3. PERSONAL COMPUTING	
4. SERVICES FOR PROFESSIONALS	
5. USER INFORMATION	
6. INDEX	
ENTER YOUR SELECTION NUMBER, OR H FOR MORE INFORMATION.	

!

nal connection. When you first sign on, CompuServe doesn't know what type of computer you have, so it assigns you the category of "Other." This initial mode locks you into uppercase-only transmission and reception. If you have either of the lowercase hardware modifications (LCA-47 or Lowerkit II) in your Color Computer, or if your terminal software gives you lowercase capability, you'll want to change the terminal defaults to let you receive and transmit lowercase, as well as reset your screen width and other variables. You can do this by typing GO CIS9, or following the menus. The menu path is: option 5 of CIS1, then option 4 of CIS4.

This section of CompuServe is called DEFALT, and you use it to customize your terminal to CompuServe. The instructions found here are good, but to read them all takes 42 pages (or screens of information) and about 15 minutes. Using DEFALT you can set your terminal type, Logon actions, printer delays, and terminal parameters.

CompuServe supports four types of terminals: Videotex, TRS-80 Model I/III, Teleray, and VT-100. The Videotex terminal mode tells CompuServe to transmit information in lines of up to 32 characters. Most Color Computer owners will use this mode. The Model I/III mode sets the information to 64 characters per line, which is best for that size of screen display. If you have one of the terminal packages for your Color Computer which lets you use 64 character lines, you can select this option. Teleray and VT-100 are two non-Tandy terminals.

DEFALT option 3 lets you determine what CompuServe does after you've logged onto the system. Normally you would go straight to CIS-1, unless you have EMAIL waiting, in which case you are told you have a message. Using the Logon option: you can tell CompuServe to inform you of waiting EMAIL, and then proceed to the EMAIL section of CompuServe to read it; set CompuServe to expert user mode (not recommended for beginners), which shortens the length of messages and prompts sent to you by CompuServe; you can have CompuServe drop you into your CompuServe programming area and automatically execute a program, such as a program you wrote that takes you straight to Micro-Quote for stock market information to down-load information; or, you can have CompuServe simply drop you into your programming area or one of the other special services available.

If you're using a printer attached to your Color Computer (via the ROM port, usually) you can specify a printer delay, with option 4 for execution after a car-

riage return or line feed, so your printer won't miss characters sent by CompuServe while the printhead is traveling back to the left margin (these delays won't function if you're accessing CompuServe through a Tymnet phone number).

Finally, with option 5, you can set terminal parameters. These parameters are line width; page size (number of lines that fit on a screen); form feeds (whether or not your terminal responds to the form feed command by clearing the screen and homing the cursor; if it doesn't, a series of print commands are issued to simulate a form feed); horizontal tabs (similar in concept to form feeds), upper- and lowercase setting; capitals lock; line feeds (whether or not each line of text needs a line feed after it); parity; and blank line control.

The upper- and lowercase setting tells CompuServe if your terminal can accept both upper- and lowercase characters, while the capitals lock forces CompuServe to translate all your transmitted characters into uppercase only. Turning the capitals lock off means you send in lowercase except when you're holding down the shift key. You'll notice that some people prefer to send in all lowercase, others in all uppercase. Few people mix cases, which makes sense, because most Color Computer owners use unmodified computers, or terminal packages that don't support real uppercase and lowercase characters, using reverse video instead.

Parity control should be explained in your terminal manual. Blank lines determine if CompuServe sends blank lines. If you're echoing information to a printer, suppressing blank lines saves paper. (I figure every blank line not sent is one character less that I have to pay for — sets of two or three line feeds mount up to wasted connection time.)

When you're in DEFALT, I'd suggest selecting the videotex terminal support, announce EMAIL and then reading it, full prompts, and no blank lines.

Exploring

With your terminal requirements set up, you're ready to start exploring the service. But before you start, you might want to see if there's a CompuServe number you can use that's closer to your area, if you're not using a local CompuServe number. To do this, examine the CompuServe telephone number database.

From the ! prompt, type cis.177 (menu path: CIS-1, option 5; CIS-4, option 8). In the phone database you can search for

telephone numbers by area code, or by US state or Canadian province two letter codes (option 3 is for 300 baud numbers, option 4 is for 1200 baud numbers). If you prefer, you can get all the numbers listed instead of only the state or area code numbers (option 5 for 300 baud, option 6 for 1200). If you're not sure of the abbreviation for your state or province, options 7 and 8 list the codes used by CompuServe.

The lists are very comprehensive, much more so than the list in the Videotex package. The database lists are also updated frequently, so you might find it prudent to check this section periodically.

SIGnificant Information

Now you'll want to meet some of your fellow Color Computer owners. To do this, you need to get to the Color Computer Special Interest Group. You can get there directly by typing GO PCS-126, or by following the menus: CIS-1, option 3; PCS-1, option 5; and finally CS-50, option 7. In the SIG sections you have many options to make it quick and easy for you to maneuver among the many messages.

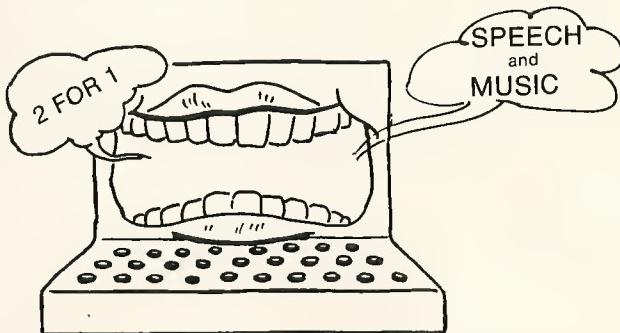
CompuServe has many different SIGs; there are SIGs for CP/M users (an operating system for Z-80 and 8080-based computers), Heath computers, Apple computers, RCA microcomputers, Panasonic computers, programmers, authors, telecommunications, and about 13 other areas of interest, including one for Color Computer owners. In the SIG areas, in general, you have many options available to make it quick and easy to maneuver among the many messages and databases available.

When you enter your selected SIG, you'll be greeted by the SIG system. If this is your first time on this SIG, you'll be asked for your name and if you want to join. Some SIGs restrict the activity of non-members, some even charge a membership fee. Both of these options are exercised by the person controlling the SIG; CompuServe itself has no control over memberships or their charges. The person controlling the SIG is called the Sysop, short for System Operator. If the Sysop has chosen to restrict membership or charge for access to the SIG, or both, you'll be informed at this stage. The Color Computer Sysop has decided not to restrict membership, or charge for it.

After this greeting, you'll be given a few statistics (your caller number and the number of messages in the system), any general interest bulletins will be listed, and the SIG main menu will be displayed

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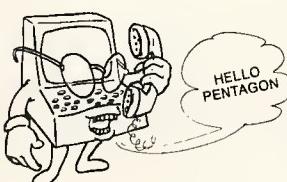
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(see Figure 2, a print out from one of my SIG sign ons). If you've been on the system before and joined the SIG, you'll be told the last date and time you were on the system (a little trap to let you know if someone has been using your ID and password without your permission).

As you can see from Figure 2, this is one area of CompuServe that isn't divided into 16-line pages. Messages and bulletins are sent to your computer in their entirety, no matter what their length. Since this would cause a problem if you're a slow reader or you want to study some information, you can stop the scrolling of information by pressing Control-P (CTRL-P). To Resume, press CTRL-Q.

The function menu in Figure 2 doesn't have two options listed: "4 (RM) Read waiting messages," and "8 (MI) How to join this SIG." Number four wasn't displayed because I didn't have any messages waiting for me, and number eight wasn't listed because I've already joined the SIG. Number eight is used by the SIGs that charge, so non-members can join after looking through the unrestricted portions of the SIG.

SIGs are divided into three sections: the bulletin board, the database, and conferencing. The first five options listed in the main menu pertain to the bulletin board, where you can read messages left

by other users on the SIG. Most of the messages are requests for help and their answers or other people's comments on the message. Sometimes these question and answer/comment exchanges can last for months, and cover hundreds of separate messages. Other messages are gossip about the hardware, software, and rumored developments. With the Color Computer SIG, the only restriction is that the messages have something to do with the Color Computer.

Reading messages is easy: select menu option 2, select a message starting number (if you don't want to start with the oldest message on line), and start reading. The format of the messages is always the same. The first line of the message tells you the sequence number of the message, and the categorical section of the message. There are currently five categories supported in the Color Computer SIG: General Interest, Color Computer Hardware, Color Computer Software, the Musical Color Computer, Private Classifieds, and Program Exchange. When you tie on to this SIG for the first time, or if you want to see if any new categories have been added, you can type ss at the : (colon) prompt and the active categories to which you have access, and their names, will be displayed. This is especially useful when exploring a new

Figure 2. SIG Sign-On, Bulletin, and Main Menu

Welcome to * The Color SIG *, V.1A(53)

Name: Terry Kepner 70615,1357

Last on: 27-Jun-83 21:56:52

High msg#: 29103

You are user number 79102

System Contains messages

29217 to 29639

Brief Bulletin:

** 7/4/83 **

Hope everyone had a super holiday!

** Want to cut down on unnecessary time on the SIG?

You can change from the "menu" system to the expert command mode by using the "OPTIONS" selection on the menu.

Then, instead of seeing the menu each time, and after reading every message, you'll be presented with a function prompt, where you enter a one or two letter command.

Take a look at the instructions to see most of the commands..enter "I" at the SIG Main Menu.

And remember you can change your line length and name, too, by using the options program.

Make the SIG work for you the way you want it to!

Enter blank line for Menu:

*The Color SIG *

Function Menu:

- 1(L) Leave a message
- 1(R) Read messages
- 3(RN) Read new messages
- 5(B) Read bulletins
- 6(ON) Online conference
- 9(OP) Change your SIG options
- 0(E) Exit from this SIG

Enter selection or H for help:

SIG. There are a maximum of eleven sections available in any SIG (0–10).

Using the extended commands available (Table 1), you can set the system to send to you only those messages having to do with a specific category, so you won't waste time reading messages about hardware when you're looking for

software. More on those commands later.

The next two lines give the subject, date, and time of the message. The subject is a short header typed in by the person leaving the message. If the message is a reply to a previous message, that message's number is referenced and its

► more

Table 1. Retrieve, Scan, and Quick Scan Instructions

SIG Retrieve Commands

- R** Read messages. You'll be prompted for <F>orward, <R>everse, or <S>elective, and then for the starting number.
- RF#** Retrieve messages in ascending serial order. If number is specified, start with that message.
- RI#** Read individual message, you must specify a number.
- RM** Read messages marked by the SM command (below).
- RN** Read messages left since you were last on-line.
- RR#** Read messages in descending serial order. If a number is specified, start with that number.
- RS** Read selective messages by searching Subject, To, or From message headers.
- SN** Display the section numbers you have access to, and their names.
- SS#** Set message retrieval to specified section number only.
- SSALL** Restore retrieval to include all available sections.

Options Available while retrieving messages

- C** or **Enter** Go to next message.
- D** Delete message sent or received by you.
- NS** No stop between messages, except ones to or from you. Use CTRL-P to return to function menu, CTRL-O to skip to next message, CTRL-C to abort listing and allow immediate exit from system, CTRL-S to pause listing, CTRL-Q to resume listing, and CTRL-A to stop output at the end of the current display line.
- RE** Reply to current message.
- RP** Read previous message, if this is a reply.
- RR** Read reply to this message, if there is one.
- RT** Read messages, automatically reading replies to messages that have them.
- T** Return to SIG Main Menu.

NOTE: RE, RP, RR, and RT resume reading messages at position where thread was first picked up.

SIG Scan Commands

- S#** Scans messages, displaying header information only. You can specify a starting number. You'll be asked for <F>orward or <R>everse scan.
- SD#** Forward scan of headers, with option to read each message. Starting number optional.
- SF#** Scan messages in ascending serial order. Starting number optional.
- SR#** Reverse order scan. Starting number optional.
- SM#** Scan message headers, and let you mark them for retrieval using RM command. SMF or SMR can be used for forward or reverse scan.

SIG Quick Scan Commands

- QS** List message numbers, subjects, section information, and number of replies to each message.
- QS#** Provide information for the specified message only.
- QS#ONLY** Restrict information to that message's thread or topic only.
- QS NEW** Information about messages left on system since the last time you were on line.
- ALL** May be appended to any of the QS commands to include individual message numbers and the senders' names to the information displayed.

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header is used. The subject line can be up to 24 characters in length.

After this comes a line with the name and user ID number of the message sender, and a line with the name and user ID number of the person to whom the message is addressed. Both lines have a maximum length of 24 characters.

Finally comes the message itself, which has a maximum length of either 96 lines or 2500 characters. After the message is listed, the bulletin board system lists the numbers of any replies to the message. If this message is a reply, the message number it is a reply to is listed.

The system now lists three possible choices of action in a Read Option Menu: 1) you can read the next message by typing a 1, a C, or just pressing the Enter key; 2) you can reply to the current message by typing 2 or RE; or 3) return to the function menu by typing 3 or T. If you sent this message, or this message is a reply to a message you left, you have another choice displayed; 4) delete the message by pressing 4 or D.

However, these are not your only choices. If the current message is a reply to a previous message, you can type RP and the previous message will be displayed. If the BBS says that there's a reply to the current message, you can type RR to read the reply, skipping the intervening messages. This is known as following a conversation thread. When the end of the thread is reached, either by reaching the beginning of the series with RP or by reading the last of the replies, you're returned automatically to your place in the message system. Thus, if the current message is number 29990 and there are replies at 30000, 30100, and 30120, you can use the RR command to read the replies, sequentially, and you'll return to Read Option Menu in front of message 29991 after reading the last reply.

A cousin to the RR message is RT, which is a general command to automatically read replies to messages whenever they're found, rather than waiting for the RR command to begin to read a specific thread. That is, RR will make the BBS read all the replies to the message you were reading when you issued the command. After returning to the sequence, if another message is discovered which has replies, you would have to reissue the RR command. But if you always want threaded messages followed in sequence, RT would "lock on" the RR command, where applicable.

The last command available is NS, non-stop. When you give this command, the messages will start scrolling, without stopping between messages, unless you reach a message you sent, or a reply to

a message you sent is reached. To stop this continuous scroll and return to the function menu, press CTRL-P. To pause the scroll, press CTRL-S, to restart it use CTRL-Q.

Sometimes you'll realize a message isn't what you thought it was, and you want to skip it. Pressing CTRL-O causes the BBS to stop output of the current message and skip to the Read Option Menu in front of the next message.

Now let's go back to the Main Function Menu again. Normally when you start scanning messages, you start at one end and go towards the other, but sometimes you don't have the time to read all the messages on the system, or you're only interested in one topic and want to read only about it. This is where the section numbers come in handy. If you type SS#, where # is one of the section numbers, you can restrict the BBS to displaying only messages with that section number. To restore all the sections for display, just enter SSALL at the Function Menu prompt.

To save time and skip the BBS prompts of starting number, you can type RF #, where RF retrieves numbers in ascending serial order, starting from the number you specify. If you want to start at the end and serially descend through the message file, use RR#. Specific messages can be retrieved with the command RI#. If you only want new messages use RN. You can also select messages according to the Subject, To, or From headers by using the RS command. For example, you could restrict retrieval to only those messages addressed to all users, or restricted to the subject of Help!.

Still another method of saving time is to scan only the headers of the messages, selecting those you want to read as you reach them, or marking them for reading at a later time. These commands are: S #, scan starting from the number you give; SD #, scan forward, with the option of reading the message or continuing to the next header; SF #, scan headers in ascending serial order from the number indicated; SR #, scan in reverse serial order from the number you specify; SM #, scan headers and let you mark them for reading using the RM command; SMF #, forward marked scan; and SMR #, reverse marked scan.

Saving even more time is the QS, quick scan command, which lists the messages' numbers, subjects, section information, and number of replies to the message. If you want you can specify only information about a specific message by typing QS #, a handy way to find out how long the conversation thread is for that message. For a more general approach, QS# ONLY restricts the quick scan to the specified message number's topic

or given thread of conversation. If you're interested only in new messages since your last time on line, use QS NEW. By appending the command ALL to any of the QS commands, you can have the BBS list individual message numbers and the name of the sender with the rest of the quick scan information.

Quick Scan is a convenient method of sorting out the different conversation threads in the BBS with a minimum of wasted time and space.

If the Color SIG interests you, be sure to read the column by Wayne Day, Color Sysop, beginning in **The Color Computer Magazine** within the next few months. Also, you might want to order the SIG instruction manual once you're a registered CompuServe member (\$3.95) — use CIS option 3.

Passwords

CompuServe suggests that all users periodically change their system password to prevent others from "discovering" it and running up illegitimate charges. I suggest changing your password every tenth access, or monthly, whichever occurs first.

To change your password, type GO CIS175 from any CIS videotex prompt, or use the menu path: CIS-1, option 5; then CIS-4, option 5.

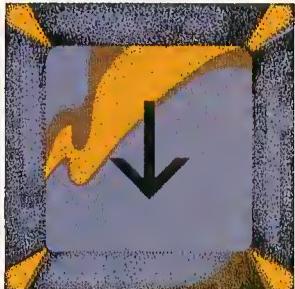
CompuServe will ask you for your old password. Type it in. It won't be displayed as you type it, in case you're not in a private room and someone may be watching you. Next you'll be prompted for the new password. Be careful, this time what you type will be displayed. The new password must be at least eight characters in length, and one of them must be a nonalphanumeric character. The maximum length is 24 characters.

Now for the tricky part. If you have a terminal program which responds to the BELL command, your computer will "beep" four times. Then three lines of apparent garbage will appear. These are the hash-codes for your password. Even if someone has your password's hash-code, it should be impossible for them to figure out your password. And CompuServe doesn't respond directly to the hash-codes, only to the password which generates them. CompuServe doesn't even store passwords in its memory banks, only the hash-code generated by the password. This is a security measure to prevent an employee of the CIS from divulging a password to someone else, either on purpose or by accident.

The only way someone can find your password is by getting it from you, or by figuring it out based on what they know

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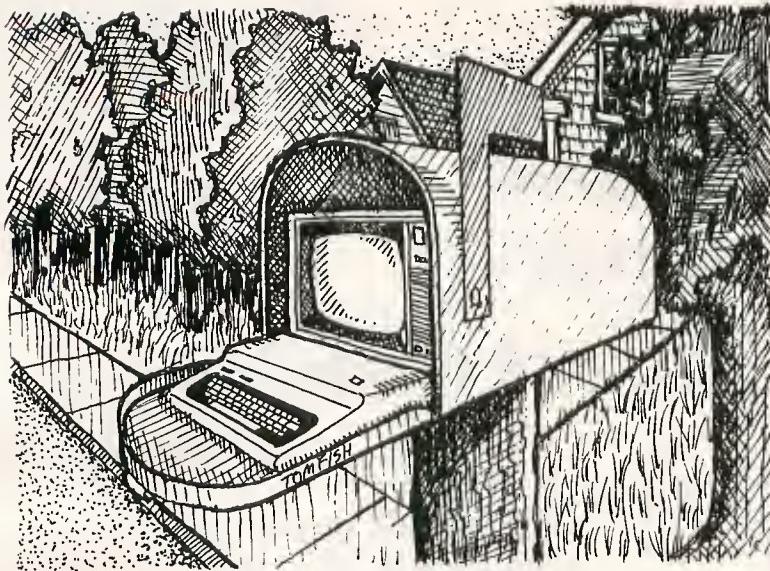
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about you (a known trekkie would be ill-advised to use SPOCK&KIRK or STAR*TREK as a password, for example).

After your new password's hash-code is computed, it's compared with the other hash-codes in memory. If the hash-code isn't already in memory, it's accepted. If the hash-code is a duplicate of one in memory, an error code will be displayed and you'll be prompted for a new password. This will repeat until a valid password is found.

When a valid password is found, CompuServe prompts you to enter the new password again, to make sure that what it received is what you sent. Don't do what I did: I thought the prompt was asking for another password, instead of asking me to retype the password for transmission verification. The verification password is encoded into a hash-code and compared with the previous hash-code. Your computer will beep four times again and three lines of apparent garbage will be displayed. Any errors will be reported to you.

When the password change is successful, you'll be returned to CIS-4. If by chance you should lose or forget your password, call CompuServe on their 800 number and describe the problem. A new password will be generated and sent to you by mail, in one of those special envelopes which are presealed with carbon paper inside. This ensures that no one sees the new password, since it's typed on the outside of the envelope, without a ribbon (the carbon inside the envelope makes it appear only on the paper inside, hence no one can see the password without opening the envelope). The mail takes about three or four days to get the password to you. It's a little inconvenient, but you shouldn't have forgotten your password!

Leaving Messages

Back to the SIGs. Messages can be addressed to the Sysop, and many times the Sysop will volunteer information, either as sign-on bulletins or in messages.

As you're reading the various messages on the system, you'll probably decide you want to reply to a message, ask for clarification of a problem, comment on a problem, or leave a request for help of your own.

If you've decided to leave a new message, select option 1 of the Function Menu. If you're reading messages and you see one to which you want to leave a reply, type RE at the Read Option Menu.

You'll now be asked for the name or user ID number of the person to whom you want the message sent. The Sysop can be addressed as Sysop as well as his name and user ID number. Next, the number one will appear with a colon beside it (1:). Type in the first line of your message (the SIGs use a simple line editor for creating messages).

When you reach your terminal's screen width (as set in DEFALT of CIS-4), the input line is terminated and the next line number appears (2:). This repeats until you finish with your message. When you're finished, press CTRL-Z to tell CompuServe that the message is complete, or leave a blank line by pressing Enter.

A menu of six options will be listed. The first option stores your message with the other messages in the SIG system. The second option lists your message on your screen, so you can see how it looks and check for errors. The third and fourth options (replace a line and delete a line) let you correct any errors you find. The fifth (continue entering text) lets you add to the message should you discover you forgot something or want to add a post-

script. And the sixth, abort, deletes the message and returns you to the function menu (or the message file if you were reading it when you decided to respond to a message).

The numbers printed while you were entering text were for your editing use only, and the line lengths used were for your terminal only. The message will be reformatted, when it's read, to match the reader's terminal parameters.

You do have limited text formatting commands available for your message. Since your message will be reformatted by CompuServe for the reader's screen, you need some way to prevent the service from combining paragraphs. Similarly, you sometimes want to indent sections of text, starting them at a display column other than zero.

Both options are supported by CompuServe. The .(period) command, as the first character of a line, forces CompuServe to start the text that follows on a new line, that is, the text following the command isn't concatenated to the previous line. The period doesn't have to be on a separate line when you're composing the message; you can type . This will start on a new display line. If you want to skip a line when the message is sent to the recipient's display, put the command on a line by itself.

The .># command is used to move the margin to the right the number of columns specified by the number after the right caret (#). To set the margin back to column zero, use .>0. All lines after the .># command will be indented that number of spaces, regardless of the length of the lines in the original message. You can temporarily set the margin to zero, until the next period command is reached, by using the .< command. When this command is reached, after a previous .># command, the margin will go to column zero until a period command is reached, which will start indenting all following text (Table 2).

more

Table 2. Message Formatting Commands

Command Result

- Force the following text to start on a new line.
- .># Force margin to start at column specified by #. All subsequent lines will be indented to this column on the recipient's display.
- .< Temporarily forces subsequent lines to start printing at column zero, until the period command is reached.
- .>0 Cancels the last .># command issued, and starts printing at column zero on recipient's display.

Telewriter-64™

the Color Computer Word Processor

- **3 display formats: 51/64/85 columns × 24 lines**
- **True lower case characters**
- **User-friendly full-screen editor**
- **Right justification**
- **Easy hyphenation**
- **Drives any printer**
- **Embedded format and control codes**
- **Runs in 16K, 32K, or 64K**
- **Menu-driven disk and cassette I/O**
- **No hardware modifications required**

THE ORIGINAL

Simply stated, Telewriter is the most powerful word processor you can buy for the TRS-80 Color Computer. The original Telewriter has received rave reviews in every major Color Computer and TRS-80 magazine, as well as enthusiastic praise from thousands of satisfied owners. And rightly so.

The standard Color Computer display of 32 characters by 16 lines without lower case is simply inadequate for serious word processing. The checkerboard letters and tiny lines give you no feel for how your writing looks or reads. Telewriter gives the Color Computer a 51 column by 24 line screen display with *true lower case characters*. So a Telewriter screen looks like a printed page, with a good chunk of text on screen at one time. In fact, more on screen text than you'd get with Apple II, Atari, TI, Vic or TRS-80 Model III.

On top of that, the sophisticated Telewriter full-screen editor is so simple to use, it makes writing fun. With single-letter mnemonic commands, and menu-driven I/O and formatting, Telewriter surpasses all others for user friendliness and pure power.

Telewriter's chain printing feature means that the size of your text is never limited by the amount of memory you have, and Telewriter's advanced cassette handler gives you a powerful word processor without the major additional cost of a disk.

...one of the best programs for the Color Computer I have seen...

— Color Computer News, Jan. 1982

TELEWRITER-64

But now we've added more power to Telewriter. Not just bells and whistles, but major features that give you total control over your writing. We call this new supercharged version Telewriter-64. For two reasons.

64K COMPATIBLE

Telewriter-64 runs fully in any Color Computer — 16K, 32K, or 64K, with or without Extended Basic, with disk or cassette or both. It automatically configures itself to take optimum advantage of all available memory. That means that when you upgrade your memory, the Telewriter-64 text buffer grows accordingly. In a 64K cassette based system, for example, you get about 40K of memory to store text. So you don't need disk or FLEX to put all your 64K to work immediately.

64 COLUMNS (AND 85!)

Besides the original 51 column screen, Telewriter-64 now gives you 2 additional high-density displays: 64 × 24 and 85 × 24!! Both high density modes provide all the standard Telewriter editing capabilities, and you can switch instantly to any of the 3 formats with a single control key command.

The 51 × 24 display is clear and crisp on the screen. The two high density modes are more crowded and less easily readable, but they are perfect for showing you the exact layout of your printed page, *all on the screen at one time*. Compare this with cumbersome "windows" that show you only fragments at a time and don't even allow editing.

RIGHT JUSTIFICATION & HYPHENATION

One outstanding advantage of the full-width screen display is that you can now set the screen width to match the width of your printed page, so that "what you see is what you get." This makes exact alignment of columns possible and it makes hyphenation simple.

Since short lines are the reason for the large spaces often found in standard right justified text, and since hyphenation is the most effective way to eliminate short lines, Telewriter-64 can now promise you some of the best looking right justification you can get on the Color Computer.

FEATURES & SPECIFICATIONS:

Printing and formatting: Drives any printer (LPVII/VIII, DMP-100/200, Epson, Okidata, Centronics, NEC, C. Itoh, Smith-Corona, Terminet, etc.).

Embedded control codes give full dynamic access to intelligent printer features like: underlining, subscript, superscript, variable font and type size, dot-graphics, etc.

Dynamic (embedded) format controls for: top, bottom, and left margins; line length, lines per page, line spacing, new page, change page numbering, conditional new page, enable/disable justification.

Menu-driven control of these parameters, as well as: pause at page bottom, page numbering, baud rate (so you can run your printer at top speed), and Epson font. "Typewriter" feature sends typed lines directly to your printer, and Direct mode sends control codes right from the keyboard. Special Epson driver simplifies use with MX-80.

Supports single and multi-line headers and automatic centering. Print or save all or any section of the text buffer. Chain print any number of files from cassette or disk.

File and I/O Features: ASCII format files — create and edit BASIC, Assembly, Pascal, and C programs, Smart Terminal files (for uploading or downloading), even text files from other word processors. Compatible with spelling checkers (like Spell 'n Fix).

Cassette verify command for sure saves. Cassette auto-retry means you type a load command only once no matter where you are in the tape.

Read in, save, partial save, and append files with disk and/or cassette. For disk: print directory with free space to screen or printer, kill and rename files, set default drive. Easily customized to the number of drives in the system.

Editing features: Fast, full-screen editor with wordwrap, block copy, block move, block delete, line delete, global search and replace (or delete), wild card search, fast auto-repeat cursor, fast scrolling, cursor up, down, right, left, begin line, end line, top of text, bottom of text; page forward, page backward, align text, tabs, choice of buff or green background, complete error protection, line counter, word counter, space left, current file name, default drive in effect, set line length on screen.

Insert or delete text anywhere on the screen without changing "modes." This fast "free-form" editor provides maximum ease of use. Everything you do appears immediately on the screen in front of you. Commands require only a single key or a single key plus CLEAR.

...truly a state of the art word processor... outstanding in every respect.

— The RAINBOW, Jan. 1982

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Telewriter-64 costs \$49.95 on cassette, \$59.95 on disk, and comes complete with over 70 pages of well-written documentation. (The step-by-step tutorial will have your writing with Telewriter-64 in a matter of minutes.) To order, send check or money order to:

Cognitec
704 N. Nob Ave.
Del Mar, CA 92014

Or check your local software store. If you have questions, or would like to order by Visa or Mastercard, call us at (619) 755-1258 (weekdays, 8AM-4PM PST). Dealer inquiries invited.

(Add \$2 for shipping. Californians add 6% state tax. Allow 2 weeks for personal checks. Send self-addressed stamped envelope for Telewriter reviews from CCN, RAINBOW, 80-Micro, 80-U.S. Telewriter owners: send SASE or call for information on upgrading to Telewriter-64. Telewriter-compatible spelling checker (Spell 'n Fix) and Smart Terminal program (Colorcom/E) also available. Call or write for more information.)

Apple II is a trademark of Apple Computer, Inc.; Atari is a trademark of Atari, Inc.; TRS-80 is a trademark of Tandy Corp; MX-80 is a trademark of Epson America, Inc.

Table 3. Message Editing Commands

Command Definition

Display Commands

- L** List your message, unformatted.
- L#** List the line specified, unformatted.
- Lx,y** List the message, starting at Line x and stopping at Line y, unformatted.
- P** List the message, formatted the way the reader will see it.
- P#** List the message, formatted, with the line length specified.

Edit Commands

- I#** Insert a line before the line number specified.
- D#** Delete the line number specified.
- E#** Edit the line number selected, you'll be prompted for the word or phrase you want removed, and for the replacement word or phrase.
- R#** Replace the specified line number.
- C** Continue composing your message after the last line previously entered.

Exit Commands

- A** Abort and completely cancel the message.
- S** Save the message in the message file, and return to the function menu, or to reading the messages.
- S#** If section numbers are implemented (they are in Color Computer SIG), then the message will be saved in the section specified (0-10).
- SP#** Add a P to the S or S# commands if you want the message to be private.

Like so many of the menus used in CompuServe, the options listed in the Leave Message Options Menu aren't the only ones available. When listing your message, you can specify the line you want listed, a range of lines, or the entire message. These commands (L, L#, and L x,y, where x and y are the beginning and ending line numbers of the lines you want listed) show your message the way you typed it, line numbers and formatting commands. If you want to see how the finished message looks to a recipient you can use the P command. If you want to see how it looks with a column count different from your terminal's setting, you can specify a number after P that CompuServe will use as characters per line limit when displaying the message.

The editing commands are listed in Table 3. The only clarification needed is for the E, edit command. You can enter it as E#Original word or phrase; replacement word or phrase. After the replacement, the new line will be displayed and you'll be asked for confirmation of the change.

are on line simultaneously. These discussions are conducted in real-time: the user who types first gets displayed first, although most such conferences have rules of procedure.

Users can request the Sysop to arrange for special guest speakers to appear on the conference line at specific dates and times. Usually such special events are announced in the SIG sign-on bulletins.

The conference line is a great way to "meet" people and discuss problems you may have with software, hardware, or logic, without having a day to day time lag between each message. The special guest events are quite popular, especially when the guests are Ed Juge, Jake Commander, and other well-known Color Computer personalities.

The conference system is divided into 22 channels, paired up with the category sections of the message system. Section zero has conference channels 30 and 31; section one has channels one and eleven; section two has two and twelve; and so forth up to section 10 with channels ten and twenty. If you have access to a category section, you also have access to its conference channels.

The commands for the conference are simple; you can select it from the Function Menu (option 6), or by typing co.

To find out who is currently on the

Conferences

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1984 Calendar

conference system, type /STA. This command will list only the people on the channels to which you're tuned (unless you specified a section number, you're automatically put in section zero, general interest, channel 30). If you're a non-member on a board with restrictions for nonmembers, only the unrestricted sections' channels will be available to you. That is, if section 2 is restricted to members only, you won't be allowed to conference on channels 2 and 12 unless you're a member.

If you want to change channels, use the /TUN command. You can "talk" on one channel while monitoring (listening to) another by using the /MON# command. To turn off the monitoring, use /UNM#, where # is the channel number. If you get confused, use the /HEL command for additional assistance. When you're finished with the conference mode and want to return to the rest of the SIG, type /EXIT. The section numbers, their channels, and the conference commands are summarized in Table 4.

■ ■ ■

Editor's Note: Terry's helpful hints will continue periodically in a new column, "CompuServe Connection."

Table 4. Conference Mode Particulars

Section	Conference Channels
0	30,31
1	1,11
2	2,12
3	3,13
4	4,14
5	5,15

Section	Conference Channels
6	6,16
7	7,17
8	8,18
9	9,19
10	10,20

Command	Purpose
/EXIT	Exit conference mode and return to SIG.
/STA	How many users are on the different channels.
/TUN	Change channels.
/MON #	Monitor an additional channel.
/UNM #	Stop monitoring a channel.
/HEL	Get help for this mode.

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"...forefront of the pack..." the Rainbow, Dec. 1982

"It is great," Dayton, OH

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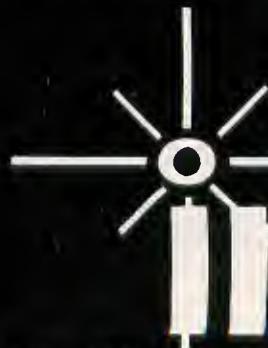
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Fifteen Database Managers

Finally: All you wanted to know about DBMs but were afraid to ask.

By Scott Norman

THE FIFTEEN DATABASE managers for the Color Computer that I reviewed range from inexpensive "electronic notebooks" for jotting down lists of things to do, to potent business-oriented packages. Database management products seem to be announced every day, so I can guarantee that this review is incomplete, but at least everything from the very simple to the very complex is represented.

Defining Terms

Although this isn't a tutorial on the principles of database management, a few definitions are in order. For our purposes, a DBM is a program that can manipulate information in a file by adding, changing, and deleting individual items, and that can search, sort, and list all or part of the file. The totality of information about any entry in the file is called a *record*, and each distinct piece of information is called a *field*.

Working back up the ladder:

- A *field* is a single piece of information (address, telephone number).
- A *record* is a set of related fields (address and telephone number for one person).
- A *file* is a set of related records (an entire directory).

Most of the programs I'll review are not database managers at all, but file managers. They only operate on one file at a time; a true database manager can work with several, picking information from here and there to create a new file. I won't refer to this distinction in most of what follows, however.

Major features of the DBMs are summarized in Table 1. Read the individual reviews for more details; these capsule commentaries will give you a feel for the programs. You'll find them listed in alphabetical order.

As always, it's a good idea to check with the vendor before ordering, to verify the current price and shipping charges.

more

How They Stack Up

	C.C. FILE	COLOR DATA ORGANIZER	COLOR FILE	DATA BASE MANAGER	DISK DATA HANDLER	FILESYS
VITAL STATISTICS PRICE CART. DISK TAPE MIN. MEMORY, K	\$12.95 T,D 16	\$19.95 T 16	\$29.95 D 16	\$198 D* 64	\$44.95 D 32	\$54.95 D 64
MAX. CAPACITIES RECORDS FILE CHARACTERS RECORD FIELDS RECORD CHARACTERS FIELD	** 240 NA NA	255 50 4 9 & 16	7 15000/FILE	** 36 252	390 99	1320 500 80 4
DATA ENTRY DATATYPES SPEC'D? ALPHABETIC INTEGER DOLLARS & CENTS OTHER FIXED-PT. FLOATING-PT. EXPONENTIAL TIME DATE	N	Y X X	Y X X	Y X X	Y Y Y	Y X X
RECORD EDITING REVIEW FULL SCREEN ACCESS BY RECORD # ACCESS BY DATA	Y N Y	N Y N	Y Y N	Y Y Y	Y N Y	N N N
CALCULATION CAPABILITY?	N	N	N	Y		
SORTING USER-CONTROLLED? NO. OF FIELDS ASCENDING DESCENDING	NA NA NA	Y 1 A	Y 1 A,D	Y 1 A	Y VARIES A,D	Y 1 A
SELECTIONS OF RECORDS SELECTION CAPABILITY COMBINE CRITERIA?	Y N	Y N	Y N	Y N	Y Y	Y N
REPORT FORMATTING STORE FORMATS? NUMBER TITLES PAGINATION RE ORDER FIELDS? VARY COL. WIDTHS MULTI-LINE FORMATS TOTAL NUM. COLUMNS SPECIAL "LABEL" FORMAT	N N N NA N Y N Y	N 2 N Y N N NY	N (PRINTS SELECTED RECORDS IN THEIR ENTIRETY)	N Y Y N N Y N N	Y NA Y N Y N Y N	N N N Y Y Y N N
DOCUMENTATION NO. OF PAGES TABLE OF CONTENTS INDEX COMMAND SUMMARY	2 N N N	6 N N N	21 Y N N	76 Y N N	12 N N N	3 N N N

*FLEX DOS REQUIRED

**LIMITED BY DISK CAPACITY

at a glance

FILMASTR	FLEXI FILER	FURST & RE- PORT WRITER COMBINATION		HOMEPAGE	PERSONAFILE	PERSONAL FILE MANAGER	PRO COLOR- FILE	RMS	TIMS
\$29.95 T D 16	\$64.95 D 32	\$40 T 16	\$50 D 16	\$75 D 32	\$59.95 D 16	\$17.95 D 32	\$79.95 D 32	\$200 D* 64	\$24.95 T 16
(PER FILE 16/32K) 255 20 9000/24000	** 240 35			DATA 250 255 49	TEXT 250 480	540 256 8 256	250 7	** 1010 60	16383 250 50 250
N		Y X X X X X	Y X X X X	Y X X X	N	N	Y X X X	Y X X X	N
Y N Y	Y N	Y N	Y N	Y N	BY SUB. & TAG N	N BY UPTO 3 ID'S	Y Y	Y N Y	N N Y
N	N	N	Y	N	N	N	Y	N	
Y 1 A	Y 1 A,D	Y 1 A	Y 1 A,D	N 1 A	NONE		Y 3 A,D	Y 1 A	Y 3 A
Y N	Y Y	Y N	Y Y	N	N	Y Y	Y Y	Y N	Y N
N Y N Y N Y Y N	Y 10 Y Y Y Y Y Y	N Y Y N N Y N N	N Y Y N N Y Y N	PRINTS ONLY THE CURRENT RECORD.		NO PRINT CAPABILITY.	Y 5 Y Y Y Y Y Y	Y ** Y Y Y Y Y N	N Y Y Y N Y N N
14 Y N Y	34 Y N Y	9 N N N	103 Y N N	28 Y N Y	23 N N N	31 Y N Y	62 Y N N	13 Y N N	

more

C.C. File

Trans Tek
194 Lockwood Lane
Bloomington, IL 60108
(312)351-1345
16K

\$12.95 tape or disk

"C.C. File" is the simplest program of the lot. An electronic "memo pad," it accepts records up to 250 characters in length; that's just about its only limitation. Text and numerical fields of any length can be entered in any order, and there are no privileged keywords for searching. Records within a file aren't even required to have the same structure.

As an example, an address book file might include entries with single-line (house number) and multiple-line (apartment number or business name) addresses. In either case, you just enter a record as a single string, with the fields separated by an @ ("at" sign). It isn't even necessary to enter a null line for a nonexistent field in a given record; many of the more highly-structured DBMs force you to do so.

"C.C. File" comes on a cassette with separate ASCII format recordings for tape and disk versions; it's easy to make a tokenized working copy of the one you need. It works reasonably well with cassettes, because the entire data file is resident in memory while you're working with it. In other words, there is no need for random access to a storage medium. That's because there are no options for sorting records or for merging files. The program does feature dynamic storage allocation, though, making the appropriate adjustments for a 16K or a 32K machine.

"C.C. File's" only other feature is the ability to locate and selectively print records. The search key can be any string that unambiguously identifies the desired record. (The Enter key causes the entire file to be printed.)

Although I prize this program because of its lack of rigorous formatting, I can imagine applications in which it would be handy to designate special keywords for a search. That could always be done by setting off the keys with a special symbol. The only symbols reserved for "C.C. File's" own use are the field separator @, and > (greater-than sign), which is used to insert ten blank spaces to format a video or printed listing.

There are also provisions for updating a file by deleting or adding records. The editing commands are essentially the

same as those used in "C.C. Writer" and "C.C. Mailer/Merger," Trans Tek's programs for text processing and mailing label preparation.

"C.C. File" may seem primitive, but in practice it is an extremely useful and friendly program.

Color Data Organizer

Computerware
Box 668
Encinitas, CA 92024
(619)436-3512
16K

\$19.95 cassette, \$29.95 disk

"Color Data Organizer" is written in Basic. It has both a file sorting capability and a provision for selecting records according to the values of numeric data fields (not according to alphanumeric fields, though). Unfortunately, each record is very limited in structure: two numeric fields, two alphanumeric fields. The numerics may be up to nine digits long (the display switches to scientific notation for larger or smaller numbers), while the alphanumerics are restricted to 16 characters. The program is really intended for 16K computers, lacking any sort of dynamic memory allocation capability that would let it take advantage of additional memory.

Like many other database managers, "Color Data Organizer" guides you along with nested menus; there are three levels of nesting in this program. There really aren't too many selections to be made, but surprisingly enough, you must issue specific commands to open and close files. This is a chore that is normally automated.

Using the main menu, you can select Storage Control, which opens and closes disk file buffers, creates a new file, or prints a directory; File Control, for entering, changing, or deleting data; or Sort-Print. You must work your way back to the main menu before exiting to Basic.

Here is a quick tour through the operation of the disk version of "Color Data Organizer"; if you are unfamiliar with DBMs, this will acquaint you with some typical tasks that the operator must perform.

To build a new file, choose the Create option of the second-level Storage Control menu. You are then presented with a third-level menu that asks for the titles to be assigned to the four data fields, numeric columns first; finally, you are asked for a file name. This is written to disk, and the Storage Control menu returns.

To enter data, select the Open option of Storage Control, and you are prompted for the file name. The disk is read and the main menu returns; now select the File Control option. This time there are only three options on the second-level menu: Input, for data entry; Look, for viewing, changing, or deleting already-stored data; and Return (to the main menu). Before you can call it quits, though, you must still go back to Storage Control to give the Close command.

You can sort a file in ascending order on any field using the Sort option of the Sort-Print menu. The Print option is fairly versatile. First, you are given the choice of printing a 40 column *label* or an 80 column *report*.

The label option puts each field on a separate line, in the order required for data entry: both numerics, then both alphabetics, with the title of each field printed at the left.

The 80 column format is more flexible, letting the user specify the order in which fields are to be printed. Now the four fields of each record are printed on a single line, with titles at the top of the printout. You can also select the records to be printed by setting inclusive upper and lower bounds on the data in one of the fields. Finally, you can specify that the data in either of the numeric fields (but not both) be totaled at the bottom of the report.

Although "Color Data Organizer" represents the next step up towards a comprehensive DBM, its data format seems too restricted for general use. I can imagine using it as a sort of lab notebook for technical data, though. Its scientific notation feature might come in handy in such an application. However, it would really be a better program if it included a keyword search capability for selecting individual records from a file.

Color File

Radio Shack
One Tandy Center
Ft. Worth, TX 76102
16K, ROMPak
\$29.95

"Color File" was one of Tandy's first Color Computer programs. It is furnished in a ROMPak, but as it is written in relocatable machine code it can be copied to tape or even to disk. In any case, it uses cassettes for data storage, which slows things down; from the amount of tape used, I assume the files are recorded in ASCII format. The program is supplied with seven predefined file formats: Ad-

resses, Warranties, Home Inventory, Investments, Auto Maintenance, Medical History, and Resume/Vita. You can define your own file structures as well.

"Color File" has a fairly complete set of commands for ordering and selecting records, and for printing the ones selected. On-screen prompts keep you pretty well informed of where you are in the menu hierarchy, although some of the abbreviations take getting used to.

For example, the first level menu for a file whose structure has already been defined takes the form of a single command line at the bottom of the screen:

ADD CHG DEL SEL ORD TAP PRT

Taken in order, these let you add a record to the file, change the current entry, delete it, select a group of entries for display, put the file in order, save the file to tape, and print selected entries.

Choosing any first level command brings a second level command line into play. Because the ability to select records according to generally useful criteria is one of the strengths of this program, let's look at the SEL commands:

SEL NO! FLD ALL = # < >

SEL is used to actually carry out the selection once a criterion has been specified. NO!, which appears in several other second-level menus, cancels the current option and returns you to the main menu. FLD lets you specify which numbered data field is to be used as the basis for selection. The last four options specify the desired criterion once a target value has been entered in this field. For this purpose, # is to be read as "not equal to."

In effect, ALL cancels SEL; no data are actually lost when you specify a selection criterion, so you can get the whole database together again by using this option.

The rest of "Color File's" commands work in a similar fashion: a second level menu, often in conjunction with full-screen editing, carries the real load.

"Color File" makes it fairly simple for the user to carry out all the basic DBM operations. Its advantages lie in its provisions for sorting a database in either ascending or descending order, and for selecting records. The selected records form a separate database that can be resorted, printed out, or used as the basis for further selections. This lets you combine search criteria with ease.

The final touch is the ability to define your own record structure. Despite the

genuine usefulness of the standard file formats, there are times when a custom job is called for. With this option, you can specify up to seven fields, and will be asked for the numeric or alphabetic character of each. All "Color File" command options are available when working on user-defined files. This makes "Color File" very useful to the homeowner whose major interests lie elsewhere, but who occasionally wants the computer to do a reliable job of specialized record-keeping.

and manipulate the same data files. A standardized data format ensures compatibility; the first 5 – 7 sectors of every file are devoted to headers which specify the number of records in the file, the number of data fields in each record, and the name, nature, and length of each field. The dates of file creation and last update are recorded, and there is a provision for protecting each file with a separate password.

The "DBM" system consists of two disks which can be purchased separately. Part I contains the bare-bones modules that let you create data files, compress and sort them, and print reports using selected fields. In Part II are the routines for printing mailing labels from suitable files, editing file headers, transferring data between files, modifying data using conditional operations, and creating index files for sorting operations.

The packaged subroutines have non-overlapping line numbers, and each is referenced in the documentation by its starting line. Thus subroutine DB100 begins at Line 100 and sets the dimensioning statements and On Error statements for a program, DB15000 clears the screen and displays a title message, DB8000 reads and analyzes the header sectors of a data file, etc. Modules are called from an applications program by the appropriate GOTO commands: GOTO 100, GOTO 15000, GOTO 8000 for these examples.

To write a "DBM" program, the user selects the desired routines (as well as any others called from within these routines) and defines variables with the names specified in the documentation. Program code must have line numbers less than 100 (for opening titles only) or between 200 and 6000; these are the only stretches unused by "DBM." The applications program itself will consist largely of a few input routines and subroutine calls. The "DBM" documentation provides examples of a few useful programs: simple data editors for a sequential master file, and a "universal" master menu.

Data Base Manager

Universal Data Research Inc.
2457 Wehrle Drive
Buffalo, NY 14221
(716)631-3011
64K, Flex

Two disk modules, \$99 each

By coincidence, the first four programs treated in this review cover the whole range of database management capabilities available to Color Computer users. The first three took us from a free-form memo pad to a modest system for the homeowner. The fourth, UDRI's "Data Base Manager," represents a major leap: it is a business-oriented powerhouse running under the Flex operating system.

The "Data Base Manager" (DBM) is a modular system with which the user can set up a customized menu-driven package for storing, manipulating, and printing data. It is not a stand-alone; instead, it consists of a number of subroutines meant to be incorporated into programs written in Technical Systems Consultants' Extended Basic (one of the most popular Flex-based languages). The subroutines are also compatible with TSC's Basic Precompiler, so they can be used in the code of a precompiler program or called as library routines when precompiling a source code file.

From all this, you can gather that "DBM" is suitable for advanced applications. The end user need not be a computer sophisticate, though; while some programming skill is required to set up a DBM system, the people who finally have to enter data or prepare printed reports can rely on menus to guide them along. The menus are contained in the packaged subroutines.

The various "DBM" routines form an integrated family, bringing many of the benefits of structured programming to Basic. As a result, all programs constructed from "DBM" modules can read

Disk Data Handler

Custom Software Engineering
807 Minutemen Causeway
Cocoa Beach, FL 32931
(305)783-1083
32K version, \$44.95;
64K version, \$54.95

In its 64K version, "Disk Data Handler" (DDH) exemplifies the powerful, moder-

ately-priced software now available for Color Computers that have been modified to allow switching over to the all-RAM "Type 1" memory map. It does not require Flex or any other operating system, but runs under the conventional Radio Shack DOS instead. The program is supplied on tape, but this is just for ease of shipment. After the tape is read, a simple conversion puts a working copy on disk.

In concept, "DDH" is similar to many other database managers; that is, it lets the user define the structures of data fields, set up video forms for data entry and editing, read and write files, and sort and select records. However, it has several unique features. One is its general user-friendliness. Most of the nomenclature used on the menus is self-explanatory, and the sorting and selection commands resemble English to an unusual degree.

For example, suppose "DDH" has been used to set up a mailing list (a tried-and-true application), and assume you want to alphabetize the list by sorting according to a field called LASTNAME. To do so, you merely choose the Sort/Select/Report option of the main menu, and then enter the command: SORT LASTNAME. That's all there is to it. Since "DDH" is written in Basic, the sort may take up to 10 seconds for 250 records, but I think you'll agree that the syntax is pretty painless.

This example would put the records in ascending order. The reverse is also possible, using the DSORT command. To add to the program's flexibility, you can specify the number of character positions to be considered in a sorting operation, and can even make the sort extend over more than one field. If the file structure was such that LASTNAME was followed by another field for first names, and if each had a maximum length of 15 characters, then: SORT LASTNAME(1-30) would perform a sort on the longest name in your file. It would put multiple entries for a given last name into ascending order according to the associated first names.

There is a similar syntax for selecting records from a file for further processing. Selection criteria can be expressed in terms of the usual equality and inequality operators, or they can use such concepts as CONTAINS and its converse, NCONTAINS. Thus the command sentence: SELECT LASTNAME CONTAINS NOR would find all mailing list entries for people named Norman, Norton, Snorkel, and so on. Selections can be chained together; *combinations like*

```
SELECT LASTNAME = SMITH  
AND ZIPCODE < 50000
```

are perfectly acceptable.

This command structure makes "DDH" a real pleasure to use. The syntax for generating reports is similar, and lets you specify one of three output devices: the video screen, the printer, or a disk file. Reports can have multi-line headers and automatic page breaks, as you would expect of a sophisticated system, but there is one oddity. If you want to store predefined report formats for "DDH," you must construct them as auxiliary ASCII files using the Basic interpreter. The syntax is meaningless for Basic, of course. Report format files are meant to be saved on disk and invoked with their own command, FILE, when they are needed.

In the same vein, "DDH" itself will not do computations on numerical fields. Instead it is necessary to write a report out to a disk file and use this as input to a Basic program for computations. This can get a bit involved, because "DDH" writes its data as strings that must then be converted with Basic's VAL function. However, the mathematical portions of the programs are unlikely to be very complicated; normally, only If/Then decisions and simple manipulations of data fields are required. The documentation (a 12-page leaflet) gives a fairly clear example in the form of a program for keeping track of the prices of stocks in a personal portfolio.

This mode of operation is actually not far from the one used by our previous review subject, "DBM." The key is the generation of standardized files which can be read by many programs.

To maximize data-storage capacity, "DDH" lets you divide data between a quick file called into RAM from the disk for sorting and selection, and an extended file. The latter resides on disk most of the time, and is not available for sorting or selecting records. Instead, the quick file incorporates the index fields to be used for these operations. If the extended file is used, an additional quick file field is used as a pointer to keep the two files synchronized.

This may sound complex, but in fact "DDH's" documentation makes it fairly simple to set up such double-file systems. The increase in system capacity is significant, too. Because the quick file (the only thing actually rearranged in a sort) can be fairly small, the size of a "DDH" file tends to be set by disk space, rather than by RAM availability. The seven-field mailing list used as an example could be only 382 records long when it was used in its entirety as a quick file. When split into quick and extended files, the "DDH" screen informed me that 1317 records were available for my particular format. Like gas

mileage, the actual numbers will vary.

Because the 64K version of "DDH" can be configured to run on 32K machines, it is probably the one to choose if you have any thoughts of expanding your system in the future. Many of the more advanced report formatting features require 64K.

Filesys

Circle City Software
P.O. Box 30166
Indianapolis, IN 46220
32K
\$9.95 cassette

"Filesys" is a simple DBM, reminiscent of "Color Data Organizer" in many ways. It has a few special features, such as the ability to use either tape or disk for data I/O. This is unique for such an economical program. Rudimentary capabilities for sorting, selective printout of records, and report formatting also exist.

All "Filesys" records must have a prescribed format: a numeric field, two alphabetic fields, and another numeric. Only positive integers are accepted for the numeric fields. The user assigns names to the fields when creating a file, and these names are subsequently used for screen prompts during the data entry and editing phases.

There are several options for changing an existing file. Instead of adding unlimited data to the end, you may choose to add just one record (the Insert mode) or to change one (the Edit mode). There are commands for moving throughout a file when editing, as well as for specifying which field of a selected record is to be changed.

The program is menu-driven and is generally easy to work with. I did find one lapse, however. If you wish to delete an entire record, you must specify the exact data in each of the four fields. In other words, having entered the offender once, you must enter it all over again to remove it! The manufacturer points out that this protects a file from accidental erasures. True enough, but the process is trickier than need be; the original data are not displayed during the re-entry, so you must trust to memory to get things right.

"Filesys" lets you put a file into ascending order according to any one of the four data fields. Like the rest of the program, the sorting routine is written in Basic; it is quite slow.

"Filesys" output can be directed to the screen or to a printer. If the printer is selected but is not on, output defaults to

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the screen. There is no possibility of the program hanging up and losing a file because you forgot to turn on the printer!

Complete or partial printouts can be specified. The latter option lets you select records for output by specifying maximum and minimum values for any one of the data fields. The maximum must actually be one greater than the largest value you want to see, however. Thus, if you were using "Filesys" to keep a phone book or similar directory and wanted a list of names from Jackson to Jones, you might designate J_a as the minimum acceptable value and J_p as the maximum; J_p is "larger" than J_a, in the sense of ASCII codes.

There is no command for searching a file for a keyword. You can narrow the record selection criterion by a suitable choice of maximum and minimum, however. If you wanted to see only the Smith entries in the hypothetical phone directory, you might specify a minimum of Smith and a maximum of Smiti.

The user has a limited degree of control over the appearance of "Filesys" reports. There is a tabbing command for setting the widths of columns, and an ability to specify one or two lines per printed record.

"Filesys" is clearly a program of modest scope, but it does offer an economi-

cal way for the Color Computer user to acquire some data management capability.

Filmastr

The Computer House

Box 1051

DuBois, PA 15801

(814)371-4658

16K

\$29.95 tape, \$34.95 disk

"Filmastr" is a robust, user-friendly program. As the price suggests, its capabilities lie somewhere in a broad middle range: it is more potent than "C.C. File" and "Filesys," but less so than "Disk Data Handler" and the higher-priced DBMs.

This program's strong points include the ability to handle up to 20 fields per record with full-screen editing of data, fast machine language sorting and selection routines, and a fairly simple syntax for formatting reports. There is almost always a brief, helpful menu present at the bottom of the screen, too. Most user options are selected by number from these menus.

Data are entered with the aid of user-designed video forms. Each file may have its own form, with a title that may or may

not correspond to that of the file itself. The user supplies the names and lengths of each field, and positions the blank fields on the video display. No distinction is made between alphabetic and numerical data at this point, so it is not necessary to learn any codes to designate what sort of information will be entered into the various fields.

"Filmastr" is a memory-resident system; the entire working file must fit into RAM, with room left over for the necessary rearrangements that take place during a sort. To put this into perspective, a 16K computer will have room for 108 records, each 78 characters long; a 32K machine can hold 305 such records. (Both figures assume a PCLEAR 1 command has been given to minimize the memory reserved for graphics.) Of course, fewer records will fit if you use more of the 255 character positions available.

A convenient feature is the ability to copy identical fields from one record to another during the data entry process. Suppose you are setting up a mailing list file, and want to enter information for the prolific Smith family; once the first record is established, there is no need to retype Smith. Just position "Filmastr's" blinking cursor in the Last Name field, hold the Clear key down, and press

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Enter. The corresponding field of the previous record will be copied.

One possible point of confusion is the use of three different keys — Break, Clear, and Enter — to perform control functions during the data entry and review process. The Break key itself calls up one of two command menus, depending on exactly where you are in the program's operation. It is sometimes necessary to go through an extra cycle of listing a file in order to get to the one desired. On the positive side, nothing short of hitting the Reset button will cause a file to be lost.

Two or more "Filmstr" files with the same structure can be combined into one; the Load command reads from disk or tape without destroying whatever is in memory. Of course, the length of the combined file cannot exceed the limits established by RAM size.

"Filmstr" can sort a file into ascending order according to the entries in any field. The machine language sorting routine will handle 300 records in about five seconds. The usual ASCII ordering conventions are followed.

Records may be selected on the basis of complete or partial matching with a key phrase, and any field may be designated for the comparison. The relational operators <and> may be used, so that

the criterion <N applied to a Last Name field would identify everyone whose surname begins with A — M.

Although Boolean operators are not allowed, a sequence of selections can be used to produce the same result. For example, the Boolean process: "Last Name < N AND First Name > K" could be duplicated by creating a "Last Name < N" file, and applying the selection "First Name > K" to it.

The records that survive a selection process form a current file that can be listed on the screen, printed, or saved to tape or disk. To recombine records with the file, return to the first menu.

Many small databases contain one or a few columns whose total is important. "Filmstr" has a command, SUM, which gives a screen listing of the total of any designated field. Only numerical entries are considered; if you lack the data for one record, it is acceptable to leave the summation field blank or even to enter a non-numeric character like ?.

It is not possible to define formats for "Filmstr" reports and store them for instant recall; instead, you must specify which fields are wanted, and in which order, whenever you require printed output. This is true of video displays, as well.

It's not hard to do: first, decide whether or not you want field labels to accompany the data, and then use a few simple codes to format the listing. Fields are designated by the ID numbers used on the data entry screen: a colon generates a line feed, and any other character (like a space, or the comma between city and state) is taken literally and printed. Format codes are limited to 31 characters, though, so it really isn't practical to set up elaborate report headings.

All in all, "Filmstr" is pretty convenient to use. The fast sort/selection routines and the ease of setting up data entry screens are probably its strongest points.

Flexi Filer

Computerware
Box 668
Encinitas, CA 92024
(619)436-3512
32K
\$64.95 disk

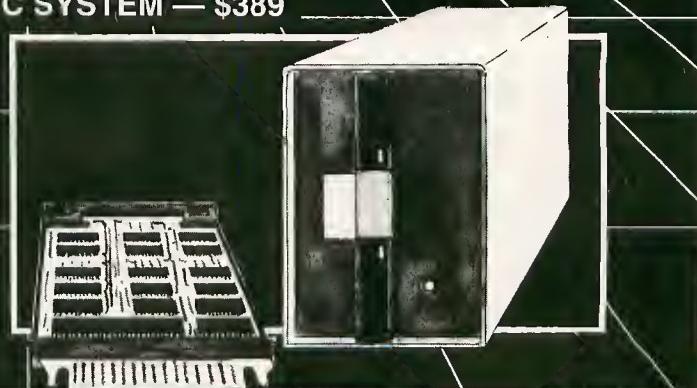
"Flexi Filer" (FF) is actually a set of several Basic programs capable of performing all the functions normally required of a file manager. Its principal features include a flexible report generator, ex-

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You don't have to use any of our utility programs though. If you write your own Basic Programs, you will find the pocket sized Votrax Dictionary (included free) is all you need to make your own Basic programs talk. This dictionary gives you quick access to the phoneme sequences used to create approximately 1400 of the most used words in the English language.

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Enter 38 on Tele Response page

tremendously powerful record selection operations, and some of the best documentation in the business.

Besides the conventional descriptive material, the 31-page manual includes such useful items as a flow chart of the relations between the five menus (including the choices that appear on the menus themselves) and a step-by-step tutorial for creating a data file and for printing labels and reports. There are also printouts from sample files on the program disk, and worksheets for laying out data-entry screens and 80-column and 132-column report formats. Very handy indeed.

"FF" is not a memory-resident system, so the size of a file is set by the space available on the disk. The number of records which a disk can hold is:

2300 x Free Gran's / Record Size in Characters

This can make for good-size files, but it does have the disadvantage that the disk will be accessed very often in the course of a working session.

Should you have so much data that a single disk is insufficient, you will have to split your file into segments stored on different disks. Unfortunately, "FF" will always treat them as separate files; they cannot be sorted together or used for a common report. This just emphasizes the fact that "FF" is a file manager, rather than a true DBM.

Like many other high-powered systems, "FF" uses video forms to guide the data entry process. Five data types are available: alphanumeric, numeric, fixed numeric (dollars-and-cents format), exponential notation, and dates. These can handle just about any information the user is likely to want, although a little caution is called for; for example, I encountered a bug in using the date format in one particular application. I'll explain it shortly.

To set up a screen format you designate the type of field desired, give it a name and length, and move a cursor to the spot where the field should begin. This is repeated for each field in a record; since there is no auto-repeat function, moving the cursor around can become a little tiresome. When it is time to actually enter data, you see the form for each field in turn. Each record is saved on disk when it is finished.

The previous record also remains in RAM. This can be helpful, because it lets you copy identical fields from one record to the next with a single keystroke. It also gave rise to my problem. It turns out that "FF" does not like blank entries for date fields. I tried to set up a sample file using several date fields, some of which were

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tween 50 and 100 kilograms, and live in New York City. One has to get used to the details of the selection syntax to ensure that the Boolean operations are carried out in the correct order, but this doesn't present a real problem.

I was generally impressed with "Flexi Filer." That bug in the date field entry routine was annoying, as was the difficulty I found when trying to insert a new field into an already-defined record format (it can't be done), but these problems must be viewed in context. The system has real strengths when it comes to record selection and report generation. As a final touch, it comes with an auto-start utility for setting up a turnkey system. This can be extremely useful where a single data file comes in for heavy use.

FURST and Report Writer

Land Systems
P.O. Box 232
Bellbrook, OH 45305
(513)848-8225
16K

FURST: \$25 cassette, \$30 disk
Report Writer: \$15 cassette, \$20 disk

"FURST" (File Update and Retrieval System) is unique among moderately-priced managers in that the file creation/maintenance programs are sold separately from the report generator. Because the bare-bones "FURST" package includes a short Basic program for producing a report based on a sample data file, the prospective purchaser can get on the air for a very modest cash outlay. Record and field selection must be done by hand, however, and so the addition of Report Writer soon becomes a necessity if you want to do anything sophisticated.

Although operationally similar, the tape and disk versions of "FURST" are actually quite different in structure. Because tape is not a random-access medium, the cassette program must load all files into RAM before working with them, whereas the disk program can shuffle information back and forth between RAM and disk as often as needed. As usual, this means that the disk version has the edge in capacity.

"FURST" consists of three Basic programs: DEDMAINT, the "Data Element Dictionary" used to define the structure of each record; FURSTUP, the principal file creation/maintenance program; and FILREORG, which actually deletes flagged records from data and index files.

The authors report that bugs in Extended Color Basic's file-handling routines could result in the loss of data if the delete function were incorporated into the body of FURSTUP; hence the separation. (I must report, however, that I have never come across any indication of such difficulties with other programs.)

The files for data and for the sorting indices are created at run time, of course. One of the characteristics of "FURST" is that the user must furnish the names of both files at several points in a typical application. This can be annoying; more complex programs keep track of the index file automatically. Users are well advised to follow the example in the documentation and choose related names for the coupled files.

The gruesomely-named DEDMAINT is the first program the user must deal with; in practice, it provides a rather simple fill-in-the-blanks framework for defining the names, lengths, and other attributes of data fields. Fields are given short descriptive names for later use in sorting and selection, but longer headings may also be associated with each field. These are the titles used when reports are printed.

One welcome feature of all the "FURST" programs comes to light almost immediately: you are given a chance to verify the correctness of every video screen of information before proceeding.

The FURSTUP program is used to enter data into a file according to the format established with DEDMAINT. You are asked to specify which DED file will be used, and must then supply names for the data file and for an index file. FURSTUP provides the environment under which records are reviewed, changed, marked for deletion, and so on. Files created here are automatically sorted in ascending order, according to a key field of your choice.

Although specific records may be marked for deletion when you exit FURSTUP, the work file will still be intact. The actual housekeeping functions are performed by FILREORG, the third program in the set. It deletes flagged records from both data and index files, and checks to make certain that both are kept synchronized.

FILREORG can also be used to create additional index files (with their own names) for a given set of data. Each index file allows you to sort the data according to a different key field. One problem is that the additional indices will become obsolete if you add or delete records from the master data file. It is up to the user to recreate index files as necessary, if the program is not to hang up during

subsequent operations.

Version 1 of "Report Writer," the output formatting program, is presently being shipped, with Version 2 promised for the near future. As it stands, "Report Writer" lets the user select the fields to appear in a given report, perform a limited kind of record selection, and specify totals for one or more numeric fields. Record selection is according to an equality criterion: the specified data must appear in the specified field for the record to be printed. Additional and/or capabilities are promised for the update. Within these limitations, "Report Writer" provides a pretty painless way to generate nicely formatted reports with descriptive headings (assuming you remembered to create them under DED MAINT!).

You can do quite a lot with the "FURST/Report Writer" combination. Other file managers are more powerful, and do a better job of keeping track of such things as index files. Nevertheless, this one does succeed in creating an overall impression of user-friendliness at a moderate price.

Homebase

Homebase Computer Systems
P.O. Box 3448
Durham, NC 27702
(919)544-5408
32K
\$75 disk

"Homebase" is a big, sprawling program, one of the most powerful non-Flex DBMs I have seen. It actually performs some of the functions of a text processor and a spreadsheet calculator, in addition to handling all the conventional file management chores. In fact, it may fairly be called a true database manager.

"Homebase's" documentation is among the most extensive of any seen in the course of preparing this review, although it does suffer from annoying typos. The program makes use of numerous nested menus, and the manual devotes a separate section to each. There are four major parts to "Homebase": text-file management, data-file management, and utilities for each type of file.

Each text record may be up to 480 characters long; that's 15 of the Color Computer's 32-character lines. Of course, there is a trade-off between the length of a record and the number of records that will fit on a disk. You may enter a record as a solid chunk of text, just as though you were writing straight prose, or you may structure it into lines entered

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in a specific order. This may be the easiest way to ensure that you can later sort and select records.

Text is entered onto a video form under full-screen editing. There are full complements of review and editing features (including global search-and-replace operations), as well as commands for formatting the text for printing.

It is often important to be able to interrogate a single piece of information in a database: i.e., a particular field of a particular record. A nice feature of "Homebase" is its ability to accept the field and record names that uniquely identify a piece of data, in either order. This reinforces the impression that the program exists to help, not hinder, the user.

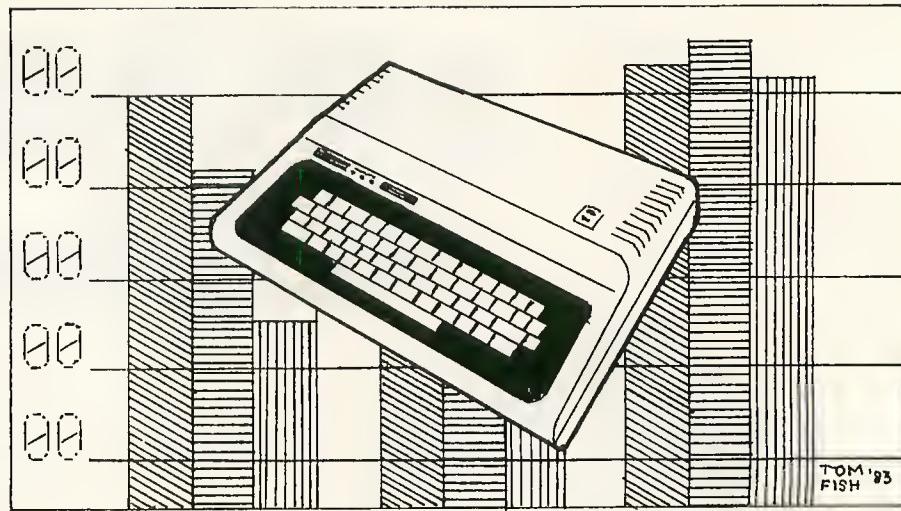
Records can be sorted into either ascending or descending order, a feature one expects of a comprehensive file manager. What is unique about "Homebase" is its ability to perform sorting and selection operations on the basis of either the data in a specified position, or on the name of the records in a file. This is true for general data files, as well as text files. In effect, selection criteria can be ANDed together by being used in sequence. The inverse (Boolean NOT) operation can be invoked by a special Exclude command; the user can elect to exclude any "Homebase" record meeting a selection criterion.

Sorting only involves auxiliary index files, by the way; the main files are not rearranged. This speeds things up, and makes the most efficient use of disk space.

The "Homebase" text utilities allow you to duplicate or merge all or parts of files, create a new empty file using record names belonging to an existing file, back-up disk files onto cassette, and synchronize two files. This feature is what gives "Homebase" its claim to the title of database manager, as opposed to file manager.

The Synchronize option can be used with two files containing different information (fields) about the same entities (record names). If particular records are selected from one file, Synchronize lets you extract the corresponding records from the second one. The files can even differ as to whether they contain text or numerical data.

Which brings us to "Homebase's" formidable capabilities for handling data files. In common with other high-end database managers, this program recognizes several different kinds of data fields: seven in all, plus comment fields for accompanying text. Special formats are reserved for dates and telephone numbers, but of even more importance are the field types named Amount and



Other. Amount fields are always printed in dollars-and-cents format (complete with dollar sign and commas where necessary), while Other fields are straight nine-digit numbers with two places after the decimal point. Only Amount and Other fields can be used in calculations.

"Homebase's" abilities to perform calculations are restricted to carrying out the four basic mathematical operations on complete rows or columns of data. Extended calculations can be handled with the aid of scratchpad fields that can store constants or intermediate results. This represents a useful level of competence, similar to the power of Radio Shack's "Spectacular."

"Homebase's" editing, sorting, and selection capabilities are similar for data and text files. Most of the file management utilities are similar, too; the exceptions are Summarize and Update, which are unique to data files.

Summarize is used to generate totals for an Amount or Other field. The novelty is that only records having a specified entry in some other key field are considered in the total. If you were to use "Homebase" to keep track of an organization's finances by entering disbursements and income items, the Summarize utility could tell you how much money had been spent on a given item — publicity, for example — over a period of time.

Update has the effect of moving a data field from one file to another, based on matching key fields. Thus the second file can be updated after new information has been entered into the first.

"Homebase" has fairly complete capabilities for report generation. Ample space is provided to insert titles, and there are facilities for automatic pagination and dating. Drawbacks to legibility include fixed field widths and lack of separation between printed fields. The user

can improve matters by selectively deleting fields from a record for reporting purposes, however.

Despite certain flaws in the report formatting routines, and difficulty in sorting fields containing both positive and negative numbers, "Homebase" must be considered an important program. It is complex but not illogical, and deserves the serious consideration of the advanced user.

Personafile

Radio Shack
One Tandy Center
Fort Worth, TX 76102
16K
\$59.95 disk

Radio Shack's "Personafile," which I reviewed in full in the May, 1983 issue of this magazine, is a straightforward program for keeping track of text information. It is really an electronic notebook file manager; there are no facilities for sorting records or for selecting specific ones for reports, and you cannot perform calculations on numerical data.

Every "Personafile" record is assigned a single 256-character block into which the user enters information. There are no fields as such, and it isn't necessary to maintain the same format for every record.

Records are indexed according to two headers called the Subject and the Tag, which establish a unique identity for information retrieval. This scheme also lets the user keep multiple files on a single disk; the general Subject label plays the role of a file name. The program provides alphabetized listings of all Subjects and Tags on a disk, to help the user find any

♦ to page 75

COLOR COMPUTER SOFTWARE



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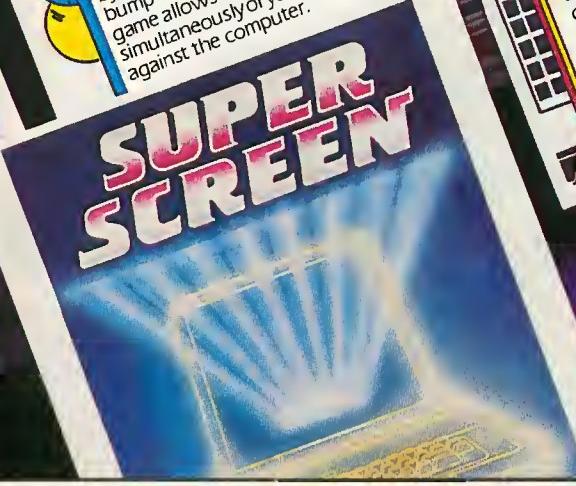
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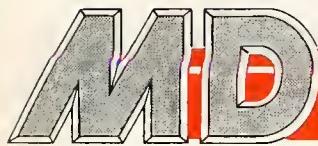
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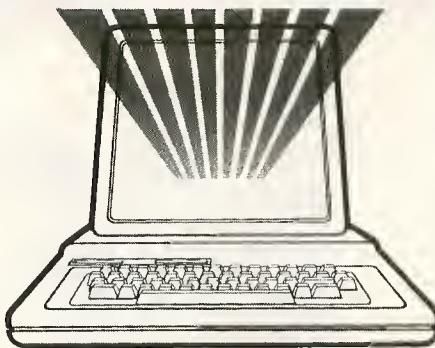
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51 CHARACTER BY 24 LINE DISPLAY

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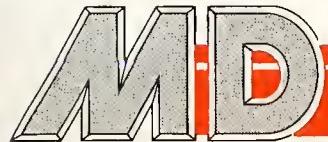
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given piece of information. It is also possible to use All for either of the headers during a search, and the asterisk can be used as a wild card search character.

Every item saved under "Personafile" goes into a single ASCII file called INFO. The name is only assigned by the program for its own use, because the user accesses data by Subject and Tag. These go into another ASCII file, INDEX, which is created and updated along with INFO. INDEX is always kept sorted in alphabetical order. The file entries themselves are not rearranged.

"Personafile's" main menu lets you add to, update, or access a file and to list or change either subjects or tags. Selection of an item brings up a brief secondary menu. As an example, the Add/Update/Access menu asks for Subject and Tag identifiers and either presents the corresponding record (if it exists) or gives you the opportunity to enter new information. It also leads to commands for changing information in an existing record, deleting the record, or printing it. Only the current record, i.e., the one on the screen at any given time, can be printed: there is no provision for automatically printing everything in a file.

"Personafile" deserves high marks for user-friendliness. Help lines are always present, and Help screens are also available for some of the menus. These are rarely needed once you have worked with the program for a short time, though.

In terms of capabilities, "Personafile" ranks above the lowest-priced programs, but is very far from the sophistication of the comprehensive, high-end file and database managers. That is unfortunate, in view of its price.

Personal File Manager

Home Information Systems
4006 Ellicott St.
Alexandria, VA 22304
32K
\$17.95 disk

Here is another modestly priced package. "Personal File Manager" (PFM) is similar to "Personafile" — intended for the storage of text with no calculation capability. It also lacks any provisions for printing information, which may be a real handicap. Within its limitations, though, it can serve fairly effectively as a repository for household-type facts.

"PFM" employs its own nomenclature: records are called *subjects*, fields are called *data items*. Given the program's likely audience, this may not be a bad thing. Purists may insist on proper

data processing terminology, but the casual user might be better off using descriptive terms like these.

Subjects are retrieved, edited, etc. according to their recall names, which play the role of "Personafile's" Subject and Tag headings. "PFM" allows as many as three recall names to be specified for each subject. Naturally enough, individual data items are recalled by their data item names. These are entered at the same time as the data items themselves when a subject is first set up. "PFM" goes along with a trend established by other informal file managers: the various subjects need not have the same structure, i.e., the same data item names.

Because the recall names are so critical, "PFM" can provide the forgetful user with a listing showing one of them for each subject. Similarly, you can get a listing of the data item names for any given subject.

All operations are driven by generous on-screen prompts, making the manual (which is pretty clear itself) almost unnecessary after a short indoctrination period. I did find one thing about the prompts annoying, though: they are poorly formatted. Words run right up to the screen margin and are broken at awkward places, which certainly detracts from any semblance of professionalism. In terms of the amount of information conveyed, though, the prompts are quite good.

The recall names are the first things that must be specified when a new subject is added to a file (the file, that is — "PFM" treats everything on the disk as one file). You are then returned to the main menu and must re-enter the A (Add) command to enter the actual information. This can be done one item at a time, or you can enter several items separated by the special PFM delimiter, \$. Even if things are entered one at a time, the \$* combination will show up when you later interrogate a subject.

The information retrieval process starts with the main menu's D (display) command, followed by one of the recall names for the subject you want. After verifying that the correct subject has been located (several of them can share a given recall name), you can request the display of a single data item or everything recorded for the subject.

Like the prompts, the screen listing of a subject's information is crudely formatted. Everything shows up in one block, broken arbitrarily at the end of 32-character lines. Only the \$* markers help you identify individual data items. Once again, the emphasis is on utility, not appearance.

"PFM" has a surprisingly extensive Edit command for revising a subject listing. A simple method of deleting unwanted subjects would be a welcome improvement, as would a Print command. It shouldn't be terribly hard to add either.

As a final comment, I should mention one awkward thing about a particular user response. One option which "PFM" gives you is to review the first line of each subject. The response which ends the review and returns you to the main menu is Y, while N brings up the first line of the next subject. I had trouble getting the hang of that. It seemed to me that I was always answering the wrong question.

Pro-Color-File

Derringer Software
P.O. Box 5300
Florence, S.C. 29502
(803)665-5676
32K
\$79.95 disk

"Pro-Color-File" (PCF) is one of the most powerful DBMs running under the standard Radio Shack DOS. It lets the user perform fairly extensive calculations, and it has a multitude of flexible commands for sorting and selecting records. Up to five report formats can be defined and stored for future recall.

Because the "PCF" system programs create a lot of files for field definitions, data-entry screen set-ups, report formats and titles, and the indices used to sort records for printing, it helps if the data files can be kept on a second disk drive. If you must use a single-drive system, it is probably best to make several copies of "PCF" and resign yourself to using each such disk for only a small number of data files. Keeping the system programs on one disk and the data on another would result in a lot of disk swapping in a one-drive system.

The first information needed by "PCF" is a listing of the data fields to be established for your file, and the length of each. As with many larger programs, it pays to spend a little time planning your database with paper and pencil.

The order in which you define the fields is relatively unimportant, because data can actually be entered in another order and the fields can be scrambled once again when report formats are set up. The important thing at this stage is simply to get a picture of what data you will furnish, and what will have to be calculated by the programs.

"PCF" records can be pretty com-

prehensive; you can define up to four segments of information for each record in a file, and each segment can contain up to 15 fields.

Next, the user defines up to four video screens for data entry. Here, data fields must first be identified as to type: alphanumeric, integer, or decimal number. There is also a fourth type: a field obtained not from data entry, but from computation by user-defined equations. Such fields can also be typed as integers or fixed-point decimal numbers with two decimal places.

Different parts of a screen can be given different background colors to guide the data entry process, and each screen can be protected against unauthorized access by a different password. The cursor is directed to fields requiring user input, skipping over any which will later be filled in by stored equations.

The next step is to set up such equations; up to 14 are permitted for each file. Fields are referred to by the numbers assigned to them during segment definition, while constants are surrounded by quotes.

"PCF's" notation resembles that of Basic in that equations read from left to right (not true in some mainframe programs of my acquaintance!). Parentheses may not be used to group terms together, though, and "PCF" ignores the hierarchy which usually dictates the order in which operations are to be performed.

The Add/Review/Update Records section of "PCF" is used for data entry; it is generously supplied with prompts. After all screen positions accessible to the user have been filled in, the Clear key invokes the equations completing all screens.

As far as updating a file is concerned, you can scan through the data searching for any specified target string, or you can pull a record for examination by specifying its number in one of "PCF's" direct access files. The order in which records were put into the database may have nothing to do with the order in which you want them presented, so "PCF" includes a three-level system for indexing, or sorting, records.

"PCF" also lets you specify whether the indexing is to be applied to all records or to a subset. Allowable selection criteria include a full range of algebraic and logical equalities and inequalities, and two such criteria can be ANDed or ORed together. You may also choose to index all the records and use the selection option later, when printing reports.

"PCF" lets you define up to five reports, each with a unique name and each capable of protection by a different password. Both single- and multi-line

formats are available, and there is complete flexibility concerning the order in which fields are presented. Records may be sorted and selected for reporting according to fields which do not themselves appear in the printed output.

Reports are designed on a video worksheet with separate areas for a title and column headings, markers which delineate the data positions, and identification of the data field associated with each position. (It is also necessary to specify data types again.) Finally, there is a print position scale to help you judge the appearance of the final report.

Obviously, the most important decision is which fields will be included. Once that is settled, "PCF's" full-screen editing capability lets you lay out the report sheet in fairly short order. There are quite a few details to be mastered, but the payoff can be some very professional-looking documents. You can specify automatic pagination, of course; numeric columns can also be totalled, and their average values computed. It is also possible to specify the number of lines per printed page and to send up to five control codes to the printer.

A brief evaluation of "PCF"? It seems to be capable of professional-quality work. Its nuances can't be learned in a half-hour session, but that would be an unrealistic expectation for any applications program in today's computing environment. "PCF" is powerful, flexible, and well supported by the vendor.

RMS (Record Management System)

Washington Computer Services
3028 Silvern Lane
Bellingham, WA 98225
(206)734-8248
64K, Frank Hogg Laboratory Flex
\$200.00 disk

Another business-oriented system, "RMS" was written with users of 6809-powered "micro mainframes" in mind. The original version was configured for use with the Southwest Technical Products CT-82 video terminal, but recently a new edition has become available, set up for the Color Computer and Frank Hogg Lab's Flex. The documentation is clearly intended for systems programmers working with bigger machines, but there is an insert purporting to list special Color Computer key sequences for various commands. There may still be a few bugs here, as I will discuss.

Like most other big, disk-oriented DBMs, "RMS" uses a number of machine language utilities to handle data definition, input screen formatting, indexing, and other chores. It is not a stand-alone package, though. In addition to Flex, "RMS" requires a text editor to prepare some of the files vital to its operation.

This need not be anything elaborate, as the file structures are rather simple. In fact, Flex's BUILD utility can be used in a pinch. Because "RMS" data files are in standard Flex text format, they can be accessed by other programs — Basic programs, for example. It is also possible to exchange data with "DynaCalc," a Flex spreadsheet program. This can get complicated, but at least the documentation provides the information and sample programs to get you started.

Let's return to more mundane matters. Associated with each "RMS" data file (usually called the master file) are a dictionary and one or more index files and report specification files.

The dictionary is actually the first thing set up, and must be constructed with a text editor. It contains information about the length and type of the data fields — alphanumeric, integer, dollars-and-cents, or date. It must also specify whether the data file will contain primary records only, or a combination of primary and secondary records.

That's worth explaining. If all records in a file have identical structure (as in a mailing list), then they are said to be primary records. They have equal status: each has a unique value of the key field, designated by the user as the field which is to be used for direct access to the file. In a mailing list, this would probably be the individual's name.

On the other hand, there are cases in which a number of associated records share a key field. Then it is useful to distinguish between primary and secondary records; members of each group share a common structure, but the groups themselves may differ.

Examples abound in business. A file may consist of primary records containing mailing list data for each customer, with secondary records for each transaction involving each customer. The customer's name is the key field in every case, but it is shared by one primary and several secondary records.

The dictionary's file name must be given an extension of .DIC. Once it has been set up, one of the programs in the "RMS" package, RMSNEW, is used to create the master data file. This must have the same root name as the dictionary, and an .RMS extension.

Creating the file just means answering two questions: the maximum length of a

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San Diego, California, 92109

record, and the number of records to be stored in the file. Because of the details of the hash coding technique used to store and retrieve records, it is advisable to specify a number about 25 percent larger than the actual anticipated maximum. It is also worthwhile to specify a prime number of records, to speed access by this particular algorithm.

At this point, the "RMS" editor (a program simply called "RMS") can be used to enter data into the master file. This comes down to filling in the blanks in a video form, as in "PCF." Editing is trickier, though.

Presumably because of its heritage on other terminals, "RMS" uses two-key combinations for many common functions: Break-U to update a record, Break-2 to display the next secondary record, and so on. I find the required two-hands technique awkward.

Worse yet, the simple cursor controls are less than obvious. The Down Arrow sends you to the previous field, while the Up Arrow homes the cursor in the first field. It's supposed to, anyway; it did nothing in the review sample of the program.

It's worth mentioning that "RMS" is not the type of editor one would use to build the data dictionary or report formats (see below). It is used to update and delete records, though. It can also be employed for quick and dirty inspection of a file.

The principal way to get information out of a file, of course, is to define and print a report. "RMS" has a routine called INDEX which creates the indexing files needed to determine the order in which records will be processed for reports. INDEX must be run whenever the master data file has been changed by the addition, updating, or deletion of records.

Report formats are defined by text files of particular syntax, created with a text editor. The name of the index file to be used with a particular report appears as the last line of the report format file.

"RMS" report formatting can be quite elaborate. As should be expected of a professional-caliber package, records can be included or excluded on the basis of high/low bounds or by inclusion in an explicit set of values. It is also possible to summarize the data from one record group (a primary record and its associated secondaries), and to total numeric and money fields. Complete control over the appearance of the printed report is also available.

The "RMS" package has many features which suit it for use in a business environment—especially one in which a systems programmer is available to set

up a DBM. The structures created by "RMS" can be made suitable for use by relatively unskilled personnel; for example, it is easy enough to incorporate validators into the data entry forms. These detect attempts to enter data that may be syntactically correct, but which lie outside of an allowable range.



Sugar Software
2153 Leah Lane
Reynoldsburg, OH 43068
(614)861-0565
16K
\$24.95 cassette

Our final review subject, "TIMS," returns us to the world of the cassette-based Color Computer system. It's by no means an afterthought, though; "TIMS" is a convenient, easy-to-learn program.

Authors Donald Dollberg and Richard White, together with the people at Sugar Software, have gone to some lengths to make "TIMS" both robust and accessible to the user. Robustness is hard to quantify, but the program just seemed to me to be unusually smooth-running. I found no unexpected responses to keyboard inputs when working with the review copy.

As for accessibility, the cassette contains two versions of the program: a compressed working copy with unnecessary spaces and line numbers deleted, and a full-blown source code reference version which the experienced user can easily modify. The instruction pamphlet helps by including a good discussion of the structures of data files and of the program itself.

A "TIMS" record can contain up to eight fields, totaling no more than 230 characters. No distinctions are made as to field types; there are no facilities for doing computations, anyway, and the sorting routines work with all kinds of data. These routines are written in machine language, and are quite fast.

Reasonably enough, you begin to create a new file by naming as many fields as you will need, and filling in the data. This involves two of "TIMS'" seven modes, Create and Input, and the program's main menu. Input is also used for adding records to an existing file.

"TIMS" lacks a full-screen editor, but does have a very nice replace-the-phrase editor for modifying a record once all the data has been entered. A phrase can be any combination of symbols sufficient to identify the information to be altered.

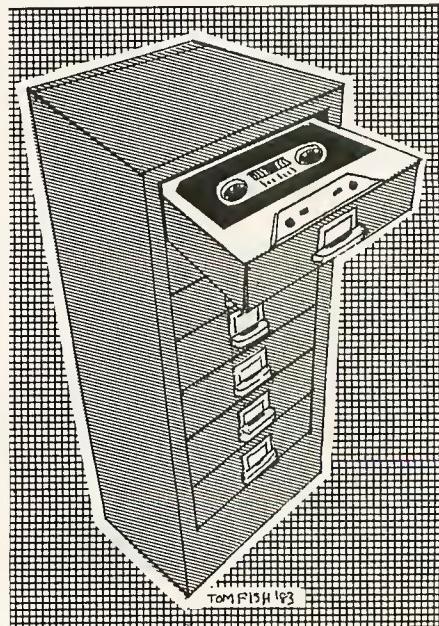
Sorts (ascending order only) can be done on up to three fields at a time. The documentation claims that a badly disorganized 120-record file can be sorted in about 15 seconds, while if the same file is nearly in order the time drops to 3–4 seconds. It is not clear whether these pertain to single or multiple-field sorts.

"TIMS" has a pair of search modes: Range Search and Item Search. As you might guess, the former identifies those records for which a target field lies within a specified range, while the latter looks for an exact match with a specified search term.

In each case, you are prompted for the identifying number of the search field. Range Search then asks for the ends of the range over which a match will be accepted. If you were to search an alphabetic field for entries beginning with M, for example, you would specify these as MA and MZ.

If the file was not sorted according to the search field, Range Search does so at this point. This is actually a two-level sort, extending to the field following the search field (if there is one).

Range Search can be used to review an entire file for editing, etc. The trick is to hit the Enter key in response to the prompts for the limiting search terms. Each record will be presented, once again in ascending order according to



the search field. A simple command line appears at the bottom of the screen: Search, Modify, Delete, Return. Search is used to step through the file; Return means "to the main menu."

In contrast, Item Search does not require a prior sort on the search field. It simply requests a target term in the specified field and returns all matching records. The target can be any unique string of symbols. The same four options are available for each hit as for Range Search, except that Return gets you back to the Item Search menu. In effect, this allows you to AND search criteria together.

"TIMS" makes it fairly simple to produce printed reports, although the options are somewhat limited. Reports are dated and paginated, and titles may be provided at run time. Each record may be represented by single or multiple print lines, and the user can specify which data fields are to appear, and in which order. The names of the fields are not printed as column headings, however.

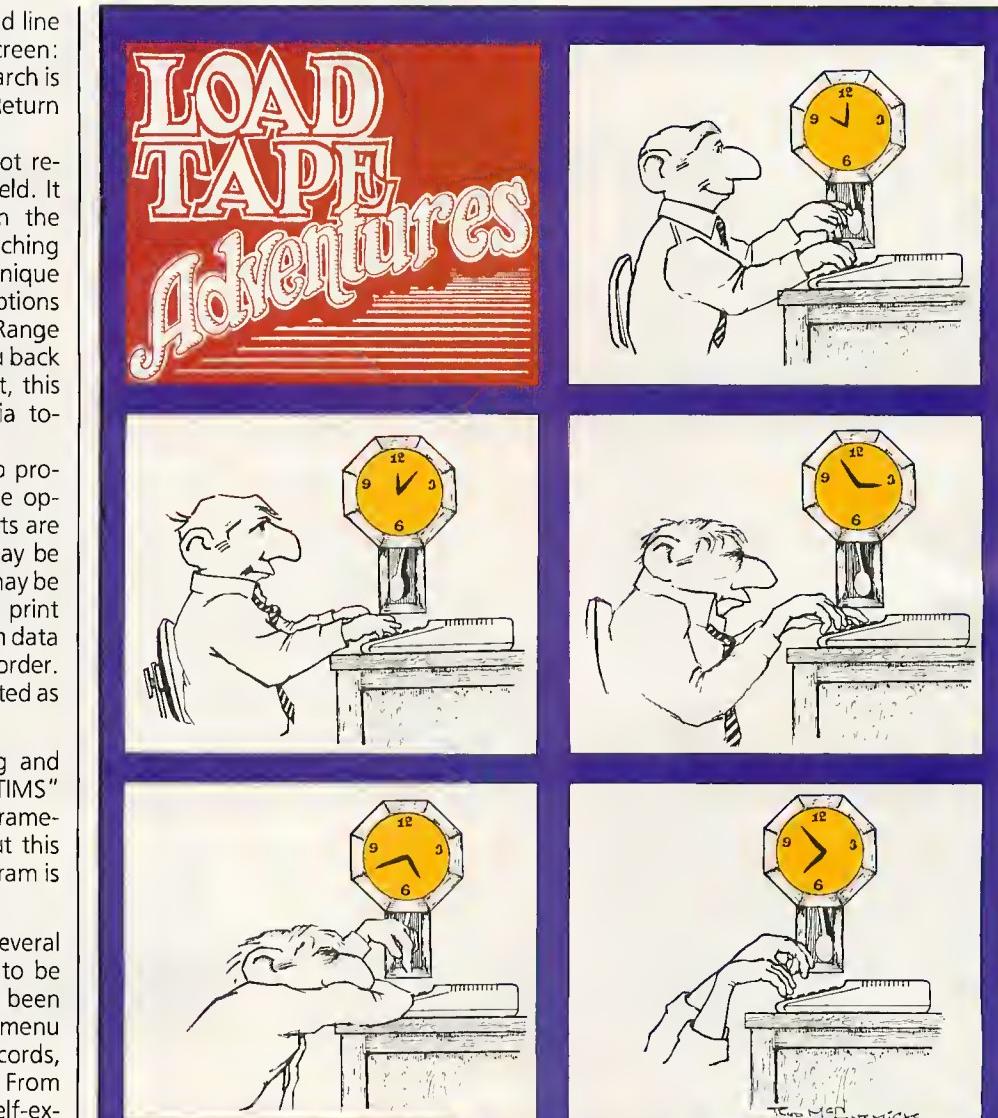
There is no facility for defining and storing multiple report formats. "TIMS" presents a menu of default print parameters which can be over-ridden, but this has to be done each time the program is run.

However, the user does have several ways to select which records are to be printed. After the formats have been specified, you receive a selection menu with three choices: Select All Records, Select Range of Records, and From Screen Listing. The first two are self-explanatory; the last one lets you pass judgment on each record in real time.

Files are printed according to the order established in the most recent sort. The sorting field need not actually be printed, however.

"TIMS'" tape-handling routines include facilities for appending one file to another, and for checking for I/O errors after a file is recorded. The append operation requires that there be sufficient RAM left, and that the two files have the same number of fields. The field names of the second file will survive, if there are differences.

While it certainly can't compare in power to the big Flex database managers, "TIMS" can do a very nice job for people who have decided to stick with cassettes. It is restricted to modest file sizes because of its need to store an entire file in memory at once, and of course it would be nice to have some ability to do calculations, but any such enhancements would bring added complexity and expense.



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The Dragon!

A review of the computer—finally!

WE HAVE A NEW PET in our house, a Dragon. Not a scaly, fire breathing reptile, but a sleek new computer produced and marketed by Tano Microcomputer Products, a division of the Tano Corporation. The Dragon is being reviewed here because, like the Color Computer, it's a 6809-based computer with color graphics, Microsoft Color Basic, ROM and joystick ports, a 6847 VDG (Video Display Generator), and so on. Many Color Computer programs will run on it. But the Dragon can not be shrugged off as some sort of cheap imitation.

The Tano Corporation is a major supplier of computer control systems for oil well companies. Their equipment uses 6809 processors and the Dragon is a logical extension of Tano's considerable engineering and manufacturing capability. Its \$399 computer has interesting, valuable features potential computer owners will do well to consider.

A Dragon's Heart

The computer consists of two circuit boards, the main "mother" board and a plug-in dc power supply board. The power supply has a large heatsink and, from an engineering viewpoint, should be very reliable. The ac supply is eight and 28 volts, supplied via an external transformer/on-off switch. Separating the transformer from the rest of the system reduces heat build-up in the computer.

The printed-circuit boards are of commercial-grade construction, with most chips soldered in. The exceptions are the SAM (Sequential Address Multiplexer), the processor, the 64K RAM chips, and the two Basic-interpreter ROMS. There is a good-quality cassette relay, no door on the ROM port, and, because of the excellent board layout, a low component count. Interestingly, the number of chips in the Dragon is higher than in the Color

**by Doug Kelley and
Larry Cadman**

Computer (32 versus 25). We attribute some of this to the parallel printer port, the monitor driver and the hardware-implemented RS-232 interface. There are also two ROMs (EPROMs on our computer) that contain the 32K and 64K interpreters.

A Dragon's Outsides

One big plus is the keyboard. Those of you who have lived with the Color Computer's flat keyboard will appreciate the Dragon's excellent Hi-Tek board (the same board sold by Mark Data for the Color Computer). The case is held together with four easy-to-locate screws: their removal will void your 90-day warranty.

The Dragon comes with an external transformer, a TV switchbox, coax cable and a cassette cable. The unit provided for our review came with a Basic programming manual and a tear-out quick reference card. According to Tano there will be a technical manual also—it is definitely needed. Ben Albert, Tano's vice president, said the production version of the Dragon will be shipped with a software pack, including a home finance spread sheet, a Basic word processor, and arcade and adventure games.

The computer has a power input jack, channel select switch, Reset button, joystick and cassette ports that are Color Computer compatible, a parallel printer port, RS-232 port, a monitor driver jack and a ROM cartridge port.

For you game nuts, Dragon joysticks are available for \$29.95, but Radio Shack sticks will work, too.

Software Compatibility

One thing that will make or break a computer is support. The Dragon already has a substantial support base because Color Computer Basic—and some machine language—programs will run on it. The Dragon will load programs saved by a Color Computer in ASCII; but, loading a machine language program is not so straightforward. If a machine language program is written using only documented ROM routines, there will be no problems with compatibility. If undocumented ROM routines are used, forget it. (See Table 1 for a cross reference of ROM routines.)

The Dragon originated in England. The Dragon by Tano is made in America. Because the English version has been available for over a year, there is considerable software support for it there. We expect British suppliers to hawk their wares here as soon as they perceive the size of the American market. Tano modified the Dragon for 64K but made the selection of the 64K mode optional. When you fire up the computer, you are in the original 32K mode and the computer will accept, without modification, any of the programs written for the Dragon 32. A British magazine, *Dragon User*, contains ads from American software suppliers for programs to run on the Dragon 32. We expect these suppliers will also be modifying programs for the 64K version. We also expect someone to write a program that will smooth over a major kink in the Dragon—the unavailability of disk use while in 64K mode (more on that later).

The Dragon's documentation consists of a sketchy introduction to its various connections and ports and a tutorial on Color Basic commands and Basic programming. Tano has assured us that a more complete technical manual is in the works.

Dragon Magic

When the computer is first turned on, a PRINT MEM command yields a value of 24871 bytes. For a surprise, type EXEC. The screen blanks for a second and, when the cursor reappears, nothing seems to have changed, except the cursor is blue instead of black. Type POKE 25,6: NEW and PRINT MEM and the memory size becomes a startling 47385.

Here is what happens: The computer jumps to memory location \$BF49 and disables the interrupts. Next, the computer copies \$8F bytes of the 32K ROM from \$BF5A to \$1DA (the cassette tape buffer) and then jumps to \$1DA. \$1DA, in turn, switches the 32K ROM off, the 64K ROM on, and copies the ROM from \$8000 to RAM at \$C000. Then the computer moves some internal pointers, resets the stack to \$BDF0, and jumps to \$C000 to restart the Basic Interpreter. There really is 64K RAM and you now have 48K of it available for your use.

The 64K mode has only a slight speed penalty for cassette users. Running the benchmark sort program in Program Listing 1, the Dragon produced results in 2:21 minutes in 32K mode, but took 2:31 in 64K. The Color Computer, running the same program, finished in 2:45. All Extended Color Basic commands are available, and, if you have a program in the system in 32K mode and switch to 64K, you do not lose the data... very nice. That's not all; in 64K mode the ROM move subroutine has been replaced with an automatic key repeat subroutine.

more

Benchmark Program

```

10 'BENCHMARK PROGRAM
20 DIM A(100)
30 FOR C=1 TO 100
40 A(C)=RND(100)
50 GOSUB 140
70 FOR X=1 TO 100
80 FOR Y=1 TO 99
90 IF A(Y)>A(Y+1)
THEN B=A(Y): A
(Y)=A(Y+1): A(Y+1)=B
100 NEXT Y
110 NEXT X
120 GOSUB 140
130 END
140 CLS
150 FOR C=1 TO 100
160 PRINT A(C);
170 NEXT C
180 RETURN
■ ■ ■

```



The Dragon exposed.

Table 1. ROM Subroutines

Name	Color Computer	Dragon	Description
PRINT	\$B99C	\$90E5	Output string pointed to by X+1 to screen
CLS	\$A928	\$BA77	Clear the text screen
POLCAT	\$A1C1	\$8006	Check the keyboard, return character in A
CHROUT	\$A282	\$B44A	Output A to current device
CSRDON	\$A77C	\$8021	Starts cassette, gets into bit sync
BLKIN	\$A70B	\$B93E	Inputs a block from tape
BLKOUT	\$A7F4	\$B999	Outputs a block to tape
JOYIN	\$A9DE	\$8012	Reads the joysticks, stores in \$15A-\$15D
WRTLDR	\$A7D8	\$801B	Turns cassette on, writes leader
SOUND	\$A951	\$BA9A	Sound for \$8C pitch, B duration
PRNNUM	\$BDCC	\$957A	Outputs the number in D to current device
GETADD	\$B73D	\$8E83	Gets value of expression, return in X

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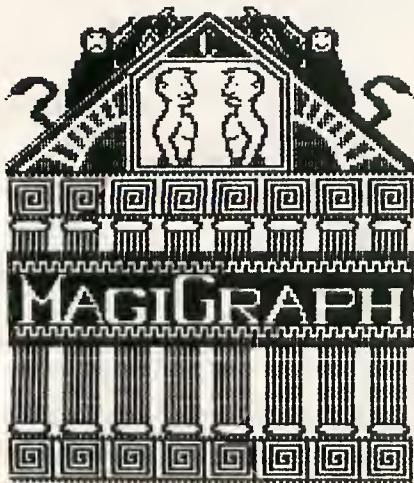
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With MagiGraph, you can create highly detailed figures up to and including an entire high-resolution screen. Designed for those with some experience in Basic and Assembly Language programming, MagiGraph includes lots of special features:

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Dragon's composite, modulated video output; and reset, joystick, tape, serial I/O, and printer ports.

More magic: The 64K mode is in RAM, but doesn't evaporate when you hit Reset. Don't believe it? We have supplied a list (Figure 4) of Basic words and their addresses. Try POKING a new word of the same length into the memory location given. You can modify the interpreter and yet it is not volatile.

Achilles' Heel?

Running a Dynamite+ disassembly of the Basic ROMs gives us a closer look at how Tano implemented some of its features. In the two memory maps of Figure 1, you can see that the locations of the Basic interpreter, cartridge memory, I/O, etc. are not too different from those in the Color Computer. Looking at Figure 2, however, we see a big difference. Note that in a 64K Color Computer, Basic resides smack in the middle of RAM, thus

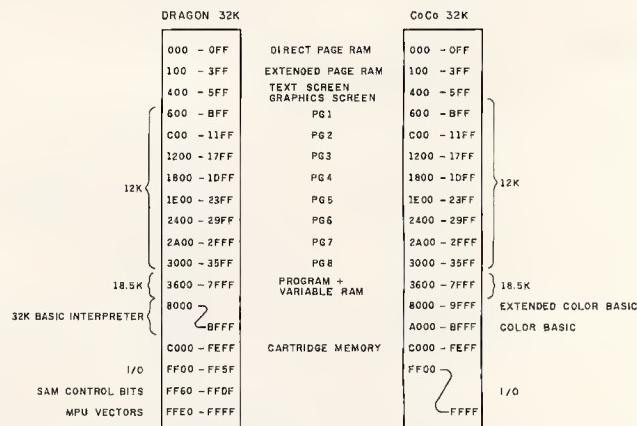


Figure 1. Dragon and Color Computer memory maps, 32K.

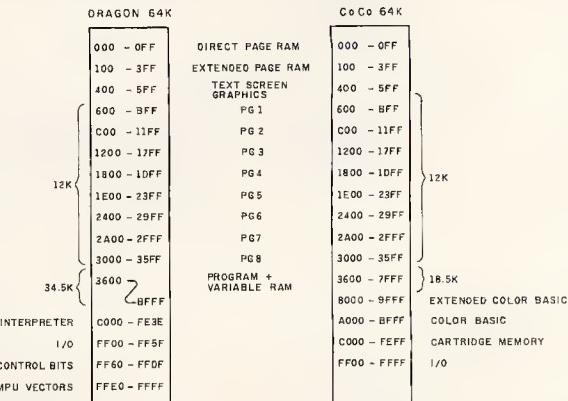


Figure 2. Dragon and Color Computer memory maps, 64K.



Dragon's power supply, and monitor ports and channel button.



Dragon's ROM port.

limiting user RAM to the lower 32K. In 64K mode, the Dragon has Basic "up top," opening up a full 48K of contiguous RAM for use by Basic.

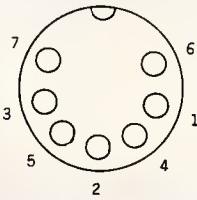
Sharp-eyed observers may notice one potential problem with this scheme. With the 64K interpreter residing at C000, what about cartridges and DOS? Cartridges present no problem because they typically auto-exec and don't require Basic. But DOS requires Basic to be present, so when you EXEC 64K, you write over the DOS and therefore will not be able to use disks in 64K mode unless some third party software is written for the Dragon.

RS-232, OS-9, And Printer Ports

In the Color Computer, serial I/O is accomplished via software. Each bit transmitted is clocked out by a subroutine in the interpreter. What this means is that anytime you are sending or receiving data, the CPU is involved. With the Dragon, you have a real, live, hardware-implemented RS-232 port. This is accomplished by using a 6551 ACIA chip (an asynchronous communication interface adapter). The advantage of this device is that it allows a full byte to be loaded by the CPU, which may then go on to other tasks. The byte is transmitted from the ACIA by a cheap clock signal, rather than by an expensive CPU (Central Processing Unit).

Have you heard of OS-9? OS-9 is a multi-user operating system that allows remote-users access to the computer via the RS-232 port. In the Color Computer, remote access will tie up the host 100 percent of the time. In the Dragon, remote access will require only a "time slice" from the CPU. This is why Radio Shack feels obliged to introduce its "Deluxe RS-232" program pak (cat. no. 26-2226) — a hardware-implemented port similar to the Dragon's, but costing \$79.95.

Pinout for the serial port is shown in Figure 3a. The reason for including + and -12v is not really clear, nor does it seem like a good idea, unless Tano is planning to produce peripherals that need these voltages.



RS-232 PLUG

PIN 1	GND
PIN 2	RECEIVE DATA
PIN 3	+12V
PIN 4	DTR
PIN 5	CLR TO SEND
PIN 6	XMIT DATA
PIN 7	-12V

Figure 3a. Pinout for Dragon's serial port.

HOT STUFF!

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DCBUG is a machine language monitor which allows you to examine and alter memory, set break points, etc.

Editor, assembler and monitor—along with sample programs—come on one Radio Shack compatible disk. Extensive documentation included. MACRO-80C by Andy Phelps. \$99.95

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- Faster to program in than Basic
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FORTH is a highly interactive language like Basic, with structure like Pascal and execution speed close to that of Assembly Language. The MICRO WORKS COLOR FORTH is a Rompack containing everything you need to run FORTH on your Color Computer.

COLOR FORTH consists of the standard FORTH Interest Group (FIG) implementation of the language plus most of FORTH-79. It has a super screen editor with split screen display. Mass storage is on cassette. COLOR FORTH also contains a decompiler and other aids for learning the inner workings of this fascinating language. It will run on 4K, 16K, and 32K computers. And COLOR FORTH contains 10K of ROM, leaving your RAM for your programs! There are simple words to effectively use the Hi-Res Color Computer graphics, joysticks, and sound.

Includes a 112-page manual with a glossary of the system-specific words, a full standard FIG glossary and complete source listing.

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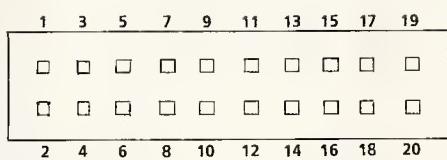
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PIN 3	DATA BIT 0	PIN 13	DATA BIT 5
PIN 4	+5V	PIN 14	GND
PIN 5	DATA BIT 1	PIN 15	DATA BIT 6
PIN 6	GND	PIN 16	GND
PIN 7	DATA BIT 2	PIN 17	DATA BIT 7
PIN 8	GND	PIN 18	GND
PIN 9	DATA BIT 3	PIN 19	ACKNOWLDG
PIN 10	GND	PIN 20	BUSY

Figure 3b. Pinout for Dragon's parallel port.

The printer port on the Dragon is a triumph of ingenuity. There are two PIAs (Peripheral Interface Adapters) in the Color Computer. There are two PIAs in the Dragon. So where do you get a parallel port?

More magic?

No, Tano simply multiplexed one port of a PIA to handle keyboard I/O and the printer port, too. This creates no problems because you don't input through the keyboard while printing, anyway. Viola! Something for (practically) nothing. The two ports are toggled by POKEing location 3FF.

One other item of interest is the

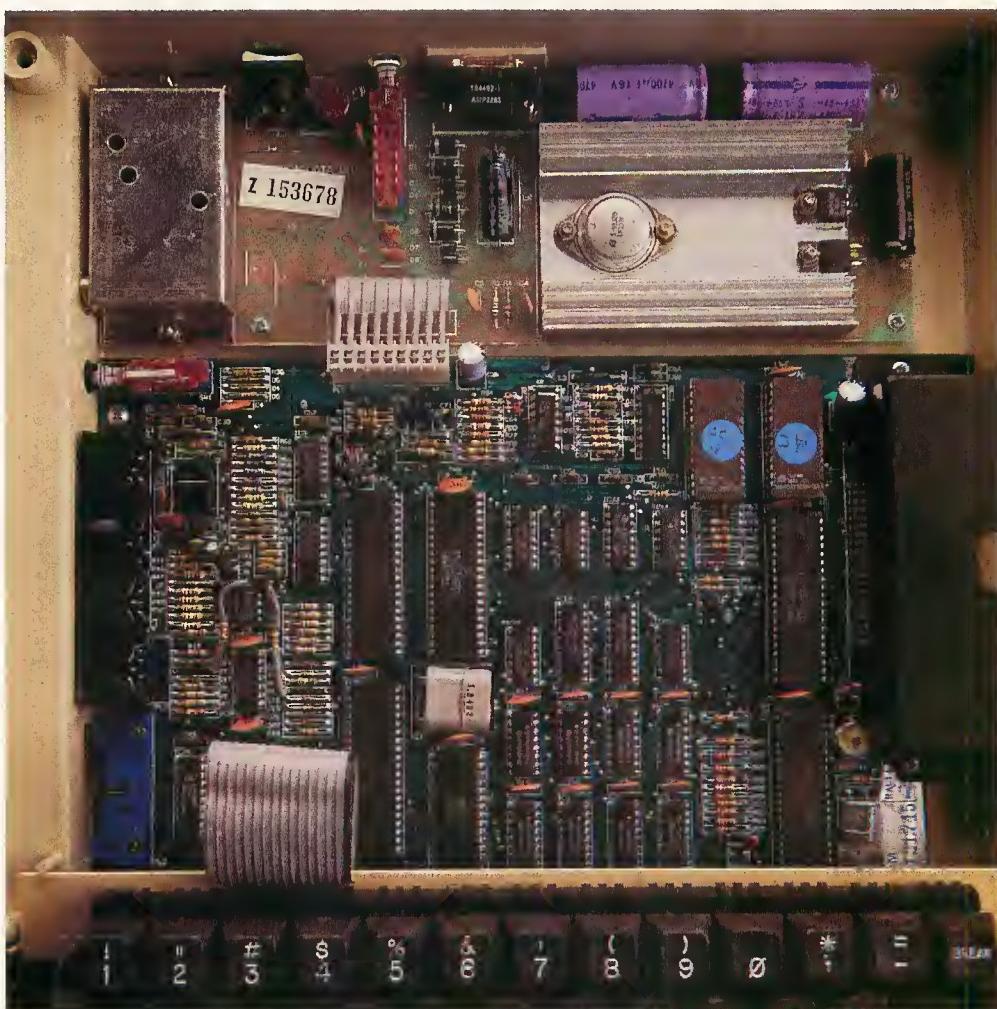
74LS244, line driver. This chip, which feeds the parallel port, is a "line" driver, not a "bus" driver. The difference is that with a line driver you can locate your printer quite a distance from the computer and not worry about interference from noise. Pinout for the parallel port is shown in Figure 3b. The connections are Centronics compatible.

Table 1 documents some useful ROM subroutines. The information compares these locations for the Dragon and Color Computer. Hopefully this information will encourage experimentation with converting existing Color Computer ML programs for use on the Dragon.

Future Features

Dragon will have four disk drives, holding 180K each. They will be run under "Dragon DOS" and format with 40 tracks, 18 sectors per track, with the directory on track 20. Tano drives will be half height with two drives per case. OS-9 is being written to run on the Dragon, too, which indicates the degree of Tano's commitment to its product. Marketing plans for the Dragon include a dealership network of computer specialty shops and distribution through "high end" department stores. ■ ■ ■

Dragon purchasers receive with their new computer nine programs on a single cassette, all adopted and enhanced for that computer. The nine programs include five of the "CC" series — Writer, Mailer, Calc, Merger, and Filer — and Courier Pilot, which helps users learn Basic, plus three games: Tower of Fear, Gold Digger, and Dragon Quest.



The mother board.



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GRABBER

Arcade Action. Method of play you are the Grabber. The object is to grab the 8 treasures and store them in the center boxes. You start with 3 Grabbers and get extra ones at 20,000 points. Watch out for the googlies! Super high resolution graphics.

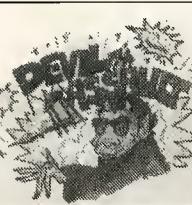
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DEVIL ASSAULT
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BUZZARD BAIT

By RUGBY CIRCLE
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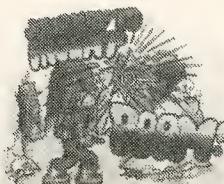
We've done it again! You thought the King was great? wait 'till you see this!!

Outstanding high resolution graphics, tremendous sound make this "Joust" type game a must for your software collection. As you fly from cloud to cloud you will enjoy sky high excitement dealing with the challenges presented to you by this newest release by Tom Mix Software.



JOURNEY TO MT. DOOM

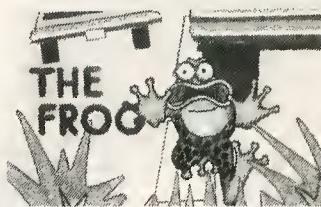
32K Mach. Lang.
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The Necromancer is about to wage war on earth. He needs his lost gold ring to acquire the power to do so. You must find the ring, take it to Mt. Doom and destroy it in the flames from which it came, thus eliminating the Necromancer's evil powers.

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ARCADE ACTION
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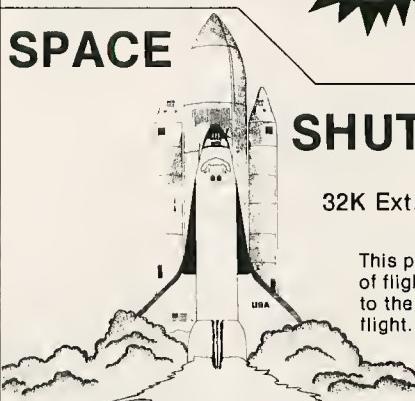
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"TRAPFALL"

By KEN KALISH

ARCADE ACTION
The "Pitfalls" in this game are many. Hidden treasures, jump over the pits, swing on the vine, watch out for alligators, beware of the scorpion. Another game for the Color Computer with the same high resolution graphics as "The King."

SPACE

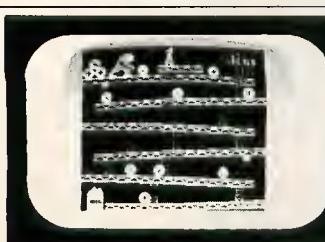


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32K Extended
Color Basic

SEARCH!

Find out where any data string is located in ROM.

by Stephen P. Allen

WHEN I GOT MY EDTASM+, the manual described how to examine memory, then said, "You are now invited to examine each section of memory using ZBUG..." I then began to peruse the Basic ROMs.

When I found what seemed to be an important routine, I wondered where it was called from and how many times in Basic it was called. This program is the result. It searches the Basic ROMs for occurrences of instructions or any other data I'd like to find.

When loaded and run, the program prompts, "SEARCH FOR WHAT?" Enter a data set (the target string) in hex. For example, a routine to convert an ASCII number string into binary is at \$AF67. \$BD is the opcode for JSR (Extended),

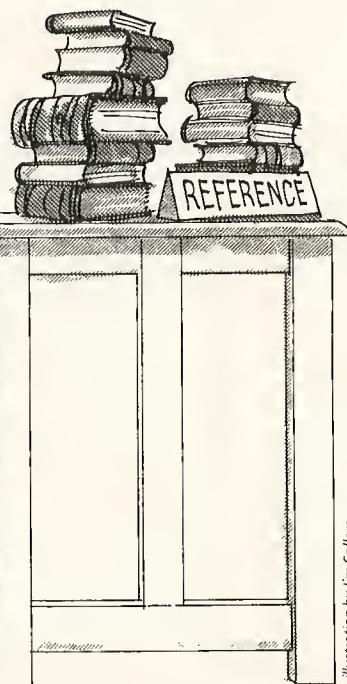


Illustration by Jim Sollers

and BDAF67 is what you type in to find from where the routine is called.

The program then asks whether to search Basic; Extended-plus Basic; or Extended Basic only. Enter option number 1, 2, or 3.

After a half second (!) the answers come back: "Eight found." Eight addresses, all in hex, are listed on the screen. Hit any key to do another search.

Search was the first program I ever wrote in machine language, and when I got it up and running I realized how fast a computer is: fast enough to search over 16,000 memory locations in half a second! At first I couldn't believe the program was working correctly, but after careful examination with ZBUG I was convinced.

Error checking is minimal. If you don't enter an even-length target string, you have to try again. The program recognizes only even-length target strings because a byte of memory is represented by two hex digits. If the target string is longer than 20 characters you'll have to enter it again. If anything other than hex is entered, it probably won't crash the program.

A very short, often-occurring target string, such as "86"(LDA#) will crash the program. In Line 350, STX A,Y treats A as a signed binary number. After the 64th occurrence of the target string, NRFND has 128, or \$80, which is a negative number in two's-complement notation. At the next occurrence of the target string, the address where it was found will be stored in reverse direction from FNDBL, and succeeding entries will overwrite the program. However, I have never found this to be a problem in normal use.

One nice thing about Search is its relocatability. The machine language routine can be put just about anywhere in RAM simply by changing two numbers at the start of the program. Be sure to leave room for FNDBL.

■ ■ ■

♦ Programs

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(by Bill Cook)

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An excellent adaptation of yahtzee type program with the addition of speech. Up to six players can compete at a time, and all scoring and record keeping is done by the computer. Requires the Spectrum Speaker, and 32K ext. basic. Let your computer talk to you for a change.

On cassette for only \$24.95
Standard SCORE E-Z \$15.95

All JARB Software talking programs require the Spectrum Speaker to work. Look for more talking programs to come.

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Program Listing. Search

```
10 'TO RELOCATE M/L ROUTINE
20 'ADJUST THE ADDRESSES IN
30 'LINES 40 AND 50
35 '
40 CLEAR200, &H 7F00
50 AD = &H 7F00
60 DEF USR 0 = AD
70 FOR C = AD TO AD+76
80 READ OP : POKE C,OP
90 NEXT C
100 CLS
110 INPUT "SEARCH FOR WHAT";T$
120 L = LEN(T$)
130 IF L AND 1 THEN 100
140 IF L>20 THEN 100
150 M = AD+83 'Starting address
of 'TARGET'
160 FOR E = 1 TO L STEP 2
170 T = VAL("&H"+MID$(T$,E,2))
180 POKE M,T
190 M = M+1
200 NEXT E
210 POKE AD+81, L/2 'String leng
th (LENTS)
220 PRINT "SEARCH LIMITS:"
230 PRINT "1 = BASIC ROM ONLY"
240 PRINT "2 = BASIC+EXTENDED"
250 PRINT "3 = EXTENDED ONLY"
260 INPUT "1,2,3";I
270 IF I<1 OR I>3 THEN 230
280 ON I GOSUB 440, 460, 480
290 SOUND 200, 1
300 P = USR(0)
310 SOUND 100, 1
320 CLS
330 PRINT @1, T$
340 ON I GOSUB 500, 510, 520
360 PRINT P; " FOUND" : PRINT :
IF P = 0 THEN 410
370 F = AD+93 'FNDTBL
380 FOR A = 1 TO P
390 PRINT HEX$(PEEK(F)*256 + PEE
K(F+1)), 'ADDRESS
400 F = F+2 : NEXT A
410 IF INKEY$ = "" THEN 410
420 GOTO 100
430 '
440 POKE AD+77, &H A0 : POKE AD+
78, 0 'SRCHST
450 POKE AD+79, &H BF : POKE AD+
80, &H FF : RETURN 'SRCHND
460 POKE AD+77, &H 80 : POKE AD+
78, 0 'SRCHST
470 POKE AD+79, &H BF : POKE AD+
80, &H FF : RETURN 'SRCHND
```

480 POKE AD+77, &H 80 : POKE AD+78, 0 'SRCHST 490 POKE AD+79, &H 9F : POKE AD+80, &H FF : RETURN 'SRCHND 500 PRINT @33, "BASIC" : RETURN 510 PRINT @33, "BASIC + EXTENDED" ":"RETURN 520 PRINT @33, "EXTENDED":RETURN 530 DATA 174,140,74,230,140 540 DATA 75,49,140,74,111 550 DATA 140,70,166,164,48 560 DATA 31,48,1,172,140	570 DATA 58,36,46,161,132 580 DATA 38,245,52,52,90 590 DATA 39,16,48,1,49 600 DATA 33,166,164,161,132 610 DATA 39,243,53,52,166 620 DATA 164,32,224,166,140 630 DATA 31,53,20,49,140 640 DATA 37,175,166,139,2 650 DATA 167,140,19,53,32 660 DATA 166,164,32,203,230 670 DATA 140,10,84,79,126 680 DATA 180,244
--	--

Program Listing. Machine Language Routine

0000 AE 8C 4A 00100	START	LDX <SRCHST,PCR	START LOOKING HERE
0003 E6 8C 4B 00110		LDB <LENTS,PCR	
0006 31 8C 4A 00120		LEAY <TARGET,PCR	POINT Y AT TARGET
0009 6F 8C 46 00130		CLR <NRNFND,PCR	NONE FOUND YET
000C A6 A4 00140		LDA ,Y	FIRST BYTE OF TARGET
000E 30 1F 00150		LEAX -1,X	PREP FOR LOOP
0010 30 01 00160	LOOP1	LEAX 1,X	NEXT ROM ADDRESS
0012 AC 8C 3A 00170		CMPX <SRCHND,PCR	LAST ROM ADDRESS?
0015 24 2E 00180		BHS DONE	YES
0017 A1 84 00190		CMPA ,X	MATCH?
0019 26 F5 00200		BNE LOOP1	NO, TRY AGAIN
001B 34 34 00210	MATCH1	PSHS Y,X,B	
001D 5A 00220	LOOP2	DEC8	LAST BYTE OF TARGET?
001E 27 10 00230		BEQ FOUND	YES
0020 30 01 00240		LEAX 1,X	NEXT ROM
0022 31 21 00250		LEAY 1,Y	NEXT TARGET
0024 A6 A4 00260		LDA ,Y	
0026 A1 84 00270		CMPA ,X	MATCH?
0028 27 F3 00280		BEQ LOOP2	YES
002A 35 34 00290		PULS B,X,Y	
002C A6 A4 00300		LDA ,Y	GET FIRST BYTE BACK
002E 20 E0 00310		BRA LOOP1	TRY AGAIN
	00315		
0030 A6 8C 1F 00320	FOUND	LDA <NRNFND,PCR	OFFSET INTO FNDBL
0033 35 14 00330		PULS B,X	RESTORE FOUND ADDRESS
0035 31 8C 25 00340		LEAY <FNDBL,PCR	TO X
0038 AF A6 00350		STX A,Y	AND SAVE IT
003A 8B 02 00360		ADDA #2	NEW OFFSET
003C A7 8C 13 00370		STA <NRNFND,PCR	
003F 35 20 00380		PULS Y	
0041 A6 A4 00390		LDA ,Y	FIRST TARGET BYTE
0043 20 CB 00400		BRA LOOP1	
	00405		
0045 E6 8C 0A 00410	DONE	LDB <NRNFND,PCR	
0048 54 00420		LSRB	DIVIDE BY 2
0049 4F 00430		CLRA	MAKE 16-BIT NUMBER
004A 7E B4F4 00440		JMP \$B4F4	GIVE IT BACK TO BASIC
	00445		
004D	00450 SRCHST	RMB 2	
004F	00460 SRCHND	RMB 2	
0051	00470 LENTS	RMB 1	
0052	00480 NRNFND	RMB 1	
0053	00490 TARGET	RMB 10	
005D	00500 FNDBL	RMB 128	
00DD	00510 ZEND	EQU	LENGTH OF THIS ROUTINE
	0000 00520	END	
00000 TOTAL ERRORS			

DONE 0045	LOOP1 0010	NRFND 0052	START 0000
FNDBL 005D	LOOP2 001D	SRCHND 004F	TARGET 0053
FOUND 0030	MATCH1 001B	SRCHST 004D	ZEND 00DD
LENTS 0051			

The OS-9 experts have developed something new.

C Compiler Version 2 for color computer OS-9 DOS for color computer Relocatable Assembler for Flex and CoCo DOS

C Compiler

Dugger's Growing Systems C is the original C Compiler for the 6809 and is the proven leader in the field. It is a growing subset of the C programming language. It runs in 20K, has assembly language output, position independent code, an extensive library in assembly language source, and code optimizer.

The Color Computer and Flex (which will run on the Color Computer) are now both available with full floating point package (float, long, for, goto, etc.) in addition to the basic C commands. CoCo Dos also contains features which use the BASIC ROM functions (cls, polcat, partial floating point, etc.).

Dugger's Growing Systems has the cost effective C for OS-9. It contains all the necessary C commands (while, if, if else, int., char, etc.) which may be linked, loaded, and used in a multi-user, multi-tasking environment.

Relocatable Assembler

The relocatable assembler package includes assembler, linker, and manager. May be used with the Color Computer or Flex.

Symbols up to 32 characters □ Many special characters allowed in symbols (\$, %, etc.) □ Multiple files assembled without exiting the assembler □ Direct output to printer at any time □ Generates either absolute or relocatable modules which are linked together with RLINK to generate executables □ Supports two types of global variables (VAR and COMN) Fortran type common □ Compatible with source for most assemblers □ Macros with parameters □ Conditional assembly.

Linker

Use text-like files which are generated by RASMB or any other source □ Allows inclusion of multiple source files, each of which can have any number of program modules □ Provide for library files, whose modules are included only as required □ Specify at link-time execution address and global storage area for easy generation of ROM-able code □ Will link together both absolute and relocatable modules □ Extensive linkage information output on request.

Manager



Provide a tool to build a "library" of relocatables □ Edit feature to list, insert, and delete modules.

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OS-9 C Compiler Version 1.2	59.95
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Enter 49 on Tele Response page

Digital Video Camera

Photography will never be the same.



THE MICRONEYE DIGITAL imaging camera can, with the help of some software, provide multi-colored video images of people, photographs, and other subjects. Patience, however, is required to capture and process a good set of images.

The Microneye is not a substitute for a home video camera and recorder. You cannot aim, shoot, and instantly get TV-quality pictures. However, once a clear Microneye image is on the screen, you have something no video camera and recorder can offer — a digitized image for storage and processing.

Potential applications include the digitizing of drawings and photos, non-contact tracing and measuring of solid objects, and live video portraits. Storing images on tape or disk is one obvious related project. It may also be possible to communicate with the Color Computer without the keyboard, using hand signals through a windowpane, even from outdoors. Yet another project might be optical character recognition (text-reading), like postal service researchers are doing.

System Description

The system I used for my experiments was a small Microneye "bullet" camera

with a standard TV camera lens mounted on a tripod. The camera was connected to an electronics package with a flat cable about four feet long and one inch wide. The three-by-nine inch electronics package plugged into the ROMPak port, so no disk operation was possible without an expansion box or a switch.

The electronics package that plugged into the ROMPak port provided interfacing functions between the computer and the camera system, and housed the driving electronics for the camera's chip. It also decoded commands from the computer.

The system drew power from the computer, so no ac plug was needed for the camera system. The electronics box plugged into the computer with a bare-board connector.

Behind the screw-on lens sat the imaging chip with two rectangular 32K-pixel arrays. These allow production of a full, square display rather than the rectangular display that would be produced by a single array.

How Microneye Works

The heart of the Microneye is a low-cost, high resolution, solid-state 64K RAM video imaging chip with a transparent lid, so a computer can read the chip's output directly. Being a digital chip, each picture element (pixel) responds only to the part of the scene it views with an "on" or "off" (high or low) status signal.

The chip consists of 32768 elements arranged in 256 columns by 128 rows. When used as a memory chip, each element can be sent an electrical pulse to "set" it either "high" or "low" — to zero or to five volts — until the power is turned off, or until the computer changes the value of the bit. The computer can read each bit without changing the value of it. With the imaging chip, when light falls on an individual element or bit that has been set high, the voltage discharges toward zero volts. The speed with which it falls is proportional to the strength of the light. Until the voltage falls to less than about 2 volts, the computer will still read this bit as "high" or a "one." In the imaging mode the computer reads the level of each bit a fraction of a second after it has set the bit "high." This means the computer can only tell if the light that's falling on the chip is stronger than a certain value by sensing if the bit is low instead of high. If a lens focuses an image on the chip, different cells can be read as either high or low at any instant. The image can be sent to memory, also 256 by 128 elements in PMODE 4, which creates a black and white picture of the image focused on the chip.

By changing the time between the setting of imaging elements "high" and the reading of their value, the computer senses the different light levels falling on the various areas of the chip. This is the principle I have used to take different "exposure-time shots" of the same subject, and to color bits or pixels that are "low" differently for each exposure time.

The Microneye system software is two Basic programs and a machine-language driver program on one cassette. An assembly language program was included, too, presumably for use in developing modified machine-language programs.

The "Meye" Basic program runs on a 16K Extended Basic system and provides a menu of functions; run, change arrays, change picture size, set exposure time, reset, and exit. The picture size option provides a choice of four resolution/screen-display formats: 512 by 128, 256 by 128, 256 by 64, or 128 by 64. These numbers refer to the imaging chip pixels rather than the Color Computer display,

since the PMODE 4 resolution is 256 by 192. The ARRAY command has a "1 array" or "2 array" option. If the "1 array" option is selected, only the top half of the video screen has an image produced on it, depending on the picture size selected. If the "2 array" option is selected, a full screen image can be obtained, again depending on the picture size selected. Here I found problems. There was a slight difference in the contrast levels of the two halves of the full-screen image, and there was a small portion of the image missing along the center line.

The final option available is to set the exposure time in milliseconds. Times range from $1/1000$ of a second to 10 seconds, with the "initial set-up" value being 100 milliseconds ($1/10$ second).

For a test image I used the Bob Dylan "Times They Are A-Changin'" record album jacket. That album jacket bears a photo of Dylan and some large block lettering. Using a 16mm focal length lens, I had to place the camera about four feet from the subject. With a 100 millisecond exposure and an incandescent bulb, I had to open the lens to its maximum value—f. 1.6. This made focusing critical, so I switched to much longer exposure times (600 to 1000 milliseconds), and operated at higher f stops, with their easier focusing (better depth of field). The images on the screen were clearly "binary"—either black or white pixels at each point on the screen. Absent were the many shades of gray that reveal subtle features.

After a little while I understood the basic requirements for getting decent images. I choose the distance from the subject to the lens to get the subject on the screen, re-aim the camera to center the subject on the screen, and experiment with exposure times and focusing.

Beyond The Instructions

No instructions are provided on how to freeze an image and store it on tape, so I wrote a simple program to do that, and another to transfer the tape image file to disk.

Then I decided to try out the imaging system with black-and-white photographs, line drawings and cartoons, a doll, and people willing to pose for portraits. Portraits were difficult until some friends and I discovered a trick that allowed us to bring out the features of a person's face. Light shining directly on a face from the front generates good contrast only between the hair and face. The camera could barely see a person's eyes, mouth, or glasses. But by holding the lamp (a 60 watt bulb in a spotlight hous-

ing) above and at different angles to the person's face, shadows accenting their features were cast. By viewing the image on the TV screen while slowly moving the lamp around the subject a greatly improved portrait can be captured.

Taking video images of photographs was only moderately successful. Again, the lack of contrast between a person's face, for instance, and the background made certain features hard to see on the screen. Using a photographic profile of myself, the digitized image turned out reasonably well, due to the contrast between my beard and the background. However, my nose did not show up (see figure on title page). I tried some cartoons

made up of narrow lines and found that all lines did not show up reliably for the same exposure value. Multiple-image combining is needed to get improved computer images.

Multiple Image Combination

Micron says the limitations of the camera and its "binary images" can be overcome by storing several black-and-white images of the same subject, each taken with different exposure times. This process captures the different levels of gray in a black-and-white photo, or the different colors in a color photo, then stores them as several individual black-and-white



*The Microneye
Digital View
System Camera*

Program Listing. To Save Microneye Files to Tape

```

9990 REM PROGRAM TO SAVE "MEYE"
FILES TO TAPE. TO USE , ADD LIN
ES 10000 -10050 TO MEYE PROGRAM
AND RESAVE ON TAPE. TO OPERATE,
HIT THE SPACEBAR WHILE VIEWING
IMAGES, THEN CHOOSE OPTION <6> (
EXIT) AND THEN ' RUN 10000'
10000 CLS
10010 PRINT @0,"SELECT NUMBER OF
CHOICE"
10012 PRINT @ 32,"<1>-VIEW IMAGE
"
10014 PRINT @64,"<2>-SAVE IMAGE"

10016 PRINT @96,"<3>-RETURN TO M
AIN PROGRAM"
10018 INPUT V: IF V=1 THEN 10020
ELSE IF V=2 THEN 10040 ELSE IF
V=3 THEN 10050
10020 PMODE4,1:SCREEN1,1
10030 GOTO10030
10040 INPUT"FILE NAME?";W$ :CSAVE
M WS,&H600,&H1DFF,&H600
10050 RUN

```



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digital images. These different black-and-white images can be computer processed to provide a single multi-colored image, with each color representing the white pixels in one of the several "binary" images. Software for this is not provided by the manufacturer, so I wrote an Extended Basic program to do this "artificial color" conversion.

My program yields colorful images that bring out a subject's features in an abstract art, high-tech style. It loads in an individual binary image file (saved previously on tape or disk). By processing binary, black-and-white images of the same subject with different exposure times for each image, a four-color image can be created. The binary image is loaded into graphics pages five to eight and becomes a two-color image in pages one to four. By loading and processing several binary image files separately, with a different foreground color used for each output image, multi-color overlays are created on the same screen.

The program takes several minutes to process each black-and-white image, and you can have fun watching it scan vertically and coloring selected pixels on the screen. (I don't think it's important to speed up this process with assembly language graphics programming.)

To improve on my portrait with the missing nose, I used the interactive drawing program "Drawer" (August, 1981 *Chromasette Magazine*) to add a nose and a forehead outline. This is all done using the arrow and other keys so that you can edit the picture on-screen, then save it on tape or disk. By viewing the color image in screen color sets 0 and 1, and in PMODEs 3 and 4, you can see many combinations of colors and contrasts. If you turn down the color control of your TV set, or if you use a black and white set, different colors appear on the screen as different shades of gray.

I recently saw the Radio Shack CGP 115 four-color graphics printer and a listing of a high-resolution screen dump program for the Color Computer. Imagine getting four-color images in hard-copy form!

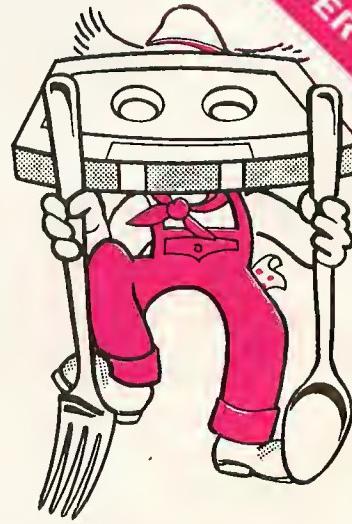


If you would like copies of the raw (binary) and processed (artificial color) images for viewing and experimenting on tape, along with the color-processing, display-selection program of Listing 3, send \$7 to H.I.B. Software, 3505 Hutch Place, Chevy Chase, MD 20815.

The Microneye Camera is available from Micron Technology, Inc., 2805 East Columbia Rd., Boise, ID 83706, (208)383-4000. The cost of the system with lens, camera, electronics and software was recently listed as \$295. —Ed.

♦ Programs

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Utilities #1 - Programming is simpler when you use Lister, Listmod, Newtrace (a better TRON), Lazkey (define keys as phrases), Append (easily combine two BASIC programs), BASIC Map, Varmap, Deleter, and CK Monitor (look at and modify memory).

Disk Utilities #1 - Harness the hidden powers of your disk system with Disk Edit (change things on disk directly), Disk Aid, Offset (EXECs most tape-only programs), Track Lock, DIRSave/Get (foil I/O errors), Cataloger, Master Catalog (keep track of your program library), and File Copy (a better BACKUP).

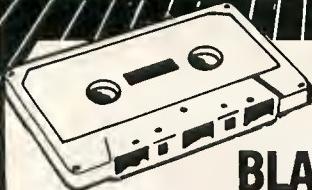
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Program Listing. To Transfer Files to Disk

```

1 REM PROGRAM TO TRANSFER MICRON
EYE IMAGE FILES FROM TAPE TO DIS
K
2 CLS: PRINT @ 0, "SELECT NUMBER
OF CHOICE"
3 PRINT @ 32, "AND <ENTER>"
4 PRINT @ 64, "<1>-LOAD TAPE FILE
AND VIEW"
5 PRINT @ 96, "<2>-SAVE TO DISK"
6 INPUT V: IF V=1 THEN 10 ELSE IF
V=2 THEN 100
10 CLS: INPUT "TAPE FILE NAME"; X$
20 CLOADM X$, &H800
30 PCLEAR8
40 PMODE4, 1: SCREEN1, 1
50 GOTO 50
100 CLS: INPUT "DISK FILE NAME"; N$
110 SAVEM N$, PEEK(188)*256, PEEK(
188)*256+(1536*4)-1, 44553
120 END

```

Program Listing. To View, Save and Process

```

1 REM PROGRAM FOR MICRONEYECAMERA FILE PROCESSING, VIEWING AND
SAVING BY HOWARD BASSEN 16K EXT
BASIC
3 REM ****DISK OWNERS**** SEE LI
NES 81 AND 2011 FOR 32K DISK BA
SIC CONVERSION
5 PCLEAR8
10 CLS
20 PRINT @ 0, "SELECT NUMBER OF C
HOICE"
21 PRINT @ 32, "AND <ENTER>"
22 PRINT @ 64, "<1>-LOAD FILE"
24 PRINT @ 96, "<2>-PROCESS/CONVE
RT TO "
25 PRINT @ 132, "MULTI-COLOR"
26 PRINT @ 160, "<3>-VIEW IMAGES"
28 PRINT @ 192, "<4>-SAVE IMAGE"
30 INPUT V: IF V=1 THEN 60 ELSE
IF V=2 THEN 90 ELSE IF V=3 THEN
1000 ELSE IF V= 4 THEN 2000
ELSE 30
60 PRINT" LOAD LONGEST EXPOSURE
IMAGE FIRST"
70 INPUT "ENTER FILE NAME"; W$
75 AUDIOON

```

```

80 CLOADM W$,&H1800
81 REM FOR DISK SYSTEM SUBSTITUTE THIS FOR LINE 80 : LOADM W$,&
H1800
85 END
90 INPUT"IS THIS FIRST IMAGE <Y/
N>?";KS
100 IF KS=="Y" THEN 110 ELSE 150
110 INPUT"SELECT BACKGROUND COLOR 1=YELLOW 2=GREEN 3=BLUE 4=RED";T
125 IF T<1 THEN 110
130 IF T>4 THEN 110
135 T=INT(T)
140 PMODE3,1:PCLS T
160 INPUT"ENTER FOREGROUND COLOR 1=YELLOW 2=GREEN 3=BLUE
4=RED";B:B=INT( B); IF B>4
THEN 160
170 IF B<1 THEN 160
180 PMODE4,5
190 SCREEN1,1
200 FOR I= 1 TO 250 STEP2
210 FOR J=1 TO 190
220 PMODE4,5
230 Y=PPOINT(I,J)
240 IF Y=5 GOSUB290
250 NEXTJ
260 PLAY"L20;A"
270 NEXT I
280 PLAY"A;B;C;":END
290 PMODE3,1:SCREEN1,1:PSET(I,J,
B)
300 RETURN

1000 CLS
1003 PRINT"ENTER <P> FOR PROCESSED (COLOR) OR <U> FOR UNPROCESSED B/W IMAGE"
1004 INPUT BS:IF BS=="P" THEN GOT0 1005 ELSE IF BS=="U" THEN GOTO 1020
1005 INPUT"COLOR SET <0 OR 1>";M
:INPUT" PMODE <3 OR 4>";L
1007 PMODEL,1:SCREEN1,M
1010 GOTO1010
1020 PMODE4,5:SCREEN1,1
1030 GOTO1030
2000 INPUT"FILE NAME"; VS
2010 CSAVEM VS,&H600,&H1DFF,&H600

2011 REM FOR DISK SYSTEM SUBSTITUTE THIS FOR LINE 2010 : SAVEM V
$,PEEK(188)*256, PEEK(188)*256+(1536*4),PEEK(188)*256

```

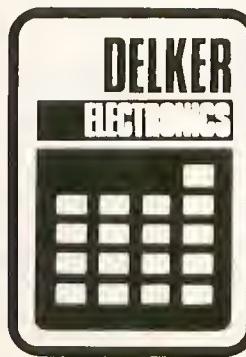
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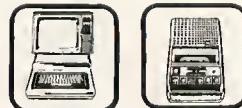


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4K Color Basic

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I was, until I decided to write all these corrections (and more), once and for all, as a subroutine I could use in any program whenever I needed it.

I accomplished three major tasks with this subroutine: first, messages like ?REDO (from typing letters when numbers are required) and ?EXTRA IGNORED (from typing too many commas, or sometimes any at all) are no longer possible. Also gone are ?OV ERRORS generated by typing numbers of more than 38 digits.

Also, the Clear key is now completely ignored, so complex screens may rest in peace.

Finally, the number of characters accepted per entry may be chosen by the main program simply by *setting* the buffer length variable BL. Characters typed after this limit is reached are ignored, and so are prevented from stumbling into important parts of the display.

by Richard Rutter

Line by Line

In Line 5000, string Z\$ is set to an empty string as keyboard characters will be stored by appending them to it. ZR and Z will become the floating point and integer values. CN is the character code for the cursor. BL is the buffer length and could be set to the needs of each program call, in which case it would not be set here.

Line 5010 is the start of an INKEY\$ loop which uses L\$ to get key values. Cursor colors start with yellow and end with orange, controlled by an automatic counter.

Line 5020 checks to see if the backspace key (Left Arrow) has been pressed. If so, a further check is made to see if a character can be deleted. When both conditions are satisfied, the rightmost character is deleted, and then erased by Line 5070. Line 5030 checks if the line erase key (Shift Left Arrow) has been pressed. If so, a string of backspaces is printed as long as the length of the input string plus one, so that the line and the cursor are erased. Everything starts over again at Line 5000.

Line 5040 is for when the user has

pressed Enter. A backspace is printed to erase the cursor, and control passes to Line 5080, which checks for numerical values. Line 5050 reacts to other character codes less than a blank space. For any of these characters, control passes back to the INKEY\$ loop in Line 5010. Line 5060 checks that the length of Z\$ will not exceed the desired buffer length. BL must never exceed 254 or an ?FC ERROR could occur in the line erase routine in Line 5030. If Z\$ is all right, L\$ is appended to it.

Line 5070 prints a backspace to erase the old cursor, the keyboard character is displayed on the screen, and a new cursor is placed after the new character. Control loops back to the INKEY\$ at Line 5010.

Line 5080 makes a last check to see if Z\$ is less than 38 characters long. If so, it sets the numerical value (VAL) from the string to ZR (real floating point value). Z gets a truncated integer value. Line 5090 returns Z\$, ZR, and Z to the calling routine in the main program.

Try the routine out before applying it to any of your programs. CLEAR at least 500 and then Enter GOSUB 5000. The routine terminates when you press Enter.

If you do use this routine in your programs, remember to pass parameters both ways. A typical calling line might look like: BL = 80 : GOSUB 5000 : TEXT\$ = Z\$: NUMBER = ZR : INVALUE = Z. Be sure your main program Clears enough string space.

Program Listing. Extended Color Basic

```

4090 'REQUIRES EXT. COLOR BASIC
(BE SURE TO CLEAR >500 BYTES)
5000 Z$"": ZR=0: Z=0: CN=159: BL=240: PRINT CHR$(CN);

5010 L$=INKEY$: TI=TI+1: IF TI>1
THEN TI=0: PRINT CHR$(8);: CN=C
N+16: IF CN>255 THEN CN=159: PRI
NT CHR$(CN); ELSEPRINTCHR$(CN);

5020 IF L$=CHR$(8) THEN IF Z$<>""
" THEN Z$=LEFT$(Z$,LEN(Z$)-1): G
OTO5070
5030 IF L$=CHR$(21) THEN PRINT S
TRING$(LEN(Z$)+1,8);: GOTO 5000
5040 IF L$=CHR$(13) THEN PRINT C
HR$(8): GOTO 5080
5050 IF L$< " " THEN 5010

5060 IF LEN(Z$)<BL THEN Z$=Z$+L$
ELSE 5010
5070 PRINT CHR$(8) L$ CHR$(CN);:
GOTO 5010
5080 IF LEN(Z$)<38 THEN ZR=VAL(Z
$): Z=INT(ZR)
5090 RETURN ■■■

```

Program Listing. Non-Extended Basic

```

4090 'WORKS W/ PLAIN COLOR BASIC
BUT NEEDS MORE STRING SPACE.
(BE SURE TO CLEAR > 750 BYTES)
5000 Z$"": KL$=CHR$(8): ZR=0: Z
=0: CN=159: BL=240: PRINT CHR$(C
N);
5010 L$=INKEY$: TI=TI+1: IF TI>1
THEN TI=0: PRINT CHR$(8);: CN=C
N+16: IF CN>255 THEN CN=159: PRI
NT CHR$(CN); ELSEPRINTCHR$(CN);
5020 IF L$=CHR$(8) THEN IF Z$<>""
" THEN Z$=LEFT$(Z$,LEN(Z$)-1): D
L$=LEFT$(KL$,LEN(KL$)-1): GOTO 5
070
5030 IF L$=CHR$(21) THEN PRINT K
L$;: GOTO 5000
5040 IF L$=CHR$(13) THEN PRINT C
HR$(8): GOTO 5080
5050 IF L$< " " THEN 5010
5060 IF LEN(Z$)<BL THEN Z$=Z$+L$
: KL$=KL$+CHR$(8) ELSE 5010
5070 PRINT CHR$(8) L$ CHR$(CN);:
GOTO 5010
5080 IF LEN(Z$)<38 THEN ZR=VAL(Z
$): Z=INT(ZR)
5090 RETURN ■■■

```



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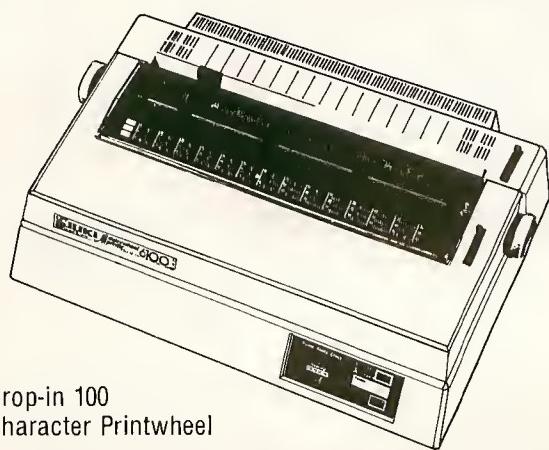
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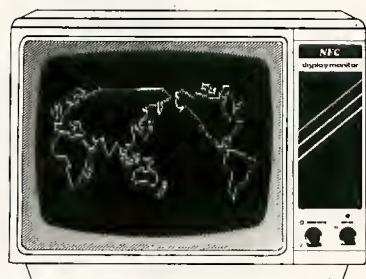


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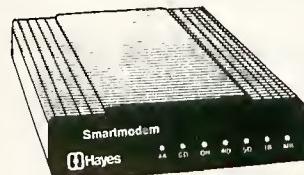
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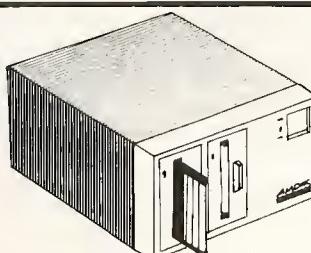
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Generic Tests



4K Color Basic

OME MONTHS BACK, I was working on a definition program where children would enter a word and then its definition, and the program would provide tests on it, or review, or it would be saved for a later date. When I finished I realized the program could be adapted to produce a test on any subject with a little work.

Here is that program. It is divided into seven sections: the first is instructions; the second lets you make up the list of questions. You can include answers if you want, or you can make up a list of general questions. For instance, the questions could be on states, i.e., capital, population and so on. For each state you would have different answers, but the questions would be the same. They are automatically loaded onto tape when you give the file name.

The next section retrieves the list from tape, and the next two sections let you review or test on them; the sixth section lets you put in new answers to the questions; the seventh section is the end.

by Robert Toscani

The Listing

Now that you understand what the program does, let's examine how it works. Program Listing 1 is for a 4K

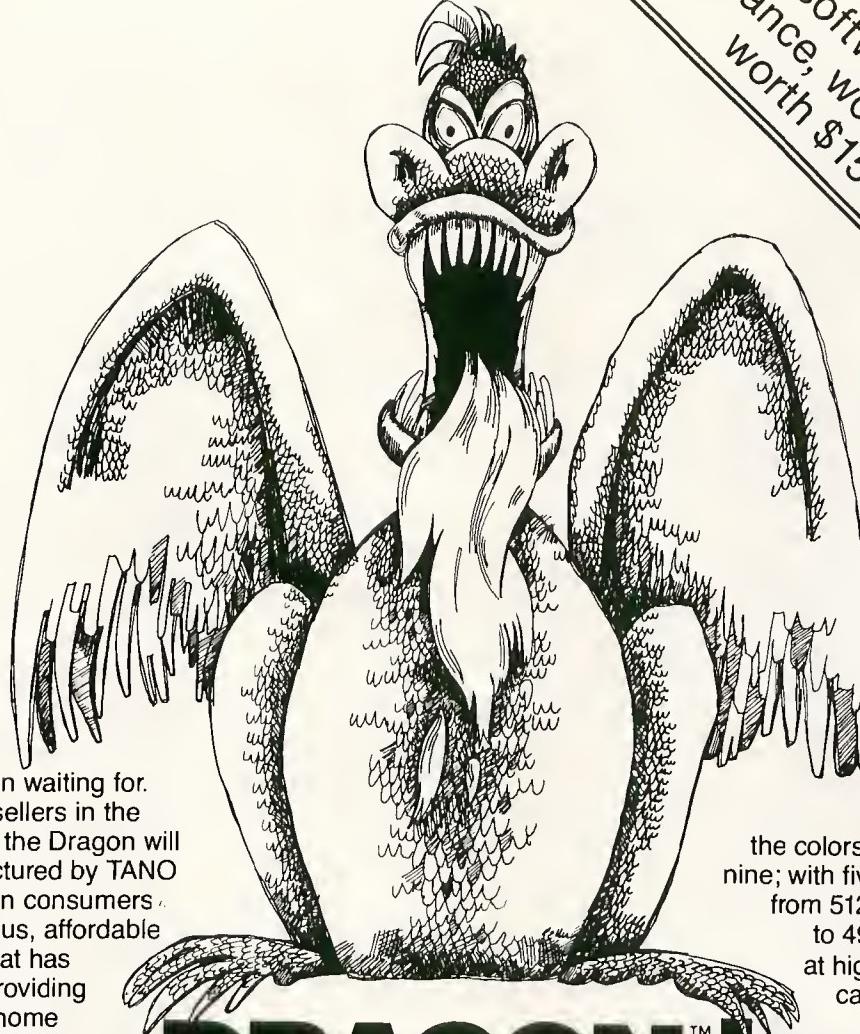
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Program Listing 1. Generic Test Program for 4K

```
1 CLEAR0:CLEARMEM-500
3 CLS:PRINT@135,"1-NEW QUESTIONS
":PRINT@167,"2-LOAD FILE":PRINT@
199,"3-REVIEW":PRINT@231,"4-TEST
":PRINT@263,"5-NEW ANSWERS
6 INPUTC:IFC<1ORC>5THEN6
9 ONC GOTO12,78,111,159,132
12 CLS
15 INPUT"NR. OF QUESTIONS, (1-10
)":A
18 IFA<1ORA>10THEN15
21 INPUT"ANSWERS Y/N":E$
24 FORB=1TOA
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```

27 PRINTB;: INPUTA$(B)
33 IF E$="N" THEN 42
36 INPUT "ANSWER"; D$(B)
42 NEXTB
45 CLS: PRINT "POSITION TAPE FOR R
ECORD, ENTER FILENAME"
48 INPUTC$
51 OPEN "O", #1, C$
54 PRINT #1, A, E$
57 FORB=1 TOA
60 PRINT #1, A$(B)
63 IF E$="N" THEN 69
66 PRINT #1, D$(B)
69 NEXTB
72 CLOSE #1
75 SOUND1, 3: GOTO 3
78 CLS: PRINT "POSITION TAPE FOR P
LAY, ENTER FILENAME"
81 INPUTC$
84 OPEN "I", #1, C$
87 INPUT #1, A, E$
90 B=1
93 INPUT #1, A$(B)
96 IF E$<>"N" THEN INPUT #1, D$(B)
99 IFEEOF(-1) THEN 105
102 B=B+1: GOTO 93
105 CLOSE #1
108 SOUND50, 3: GOTO 3
111 CLS
114 FORB=1 TOA
117 PRINTA$(B)
120 PRINT "ANSWER :" D$(B)
123 GOSUB 201
126 NEXTB
129 GOTO 3
132 CLS
135 FORB=1 TO A
138 PRINTA$(B)
141 INPUT "ANSWER-"; D$(B)
150 NEXTB
153 INPUT "SAVE ON TAPE Y/N"; E$
156 IF E$="Y" THEN 45 ELSE IF E$="N" TH
EN 3 ELSE 153
159 G=RND(A)
162 PRINTA$(G)
165 INPUT "ANSWER-"; G$(G)
168 IF G$(G)=D$(G) THEN PRINT "CORRE
CT" ELSE PRINT "WRONG. THE CORRE
CT ANSWER IS " D$(G)
171 INPUT "ANOTHER Y/N"; H$
174 IF H$="Y" THEN 159 ELSE 3
201 PRINT "PRESS ANY KEY TO CONTI
NUED"
204 IF INKEY$="" THEN 204
207 RETURN

```

■ ■ ■

Color Basic Color Computer, but Program Listing 2 should run on a 16K machine. Also, there is one place where the Extended Basic line input statement could be used. Listing 2:

Line 3 prints the menu. After each section is finished, that's the line you go back to. Line 6 makes sure your choice is in the menu, and Line 9 sends the program to the proper line.

Line 12 is the start of section two. It asks how many questions you want. I limited it to ten to avoid any possible problems with dimensioning. Line 21 lets you include answers. Line 27 prints the number of the question and asks for it. Line 30 lets you correct any mistake you might have made in the question, before moving on to the next one.

Line 33 checks to see if you are including answers. If so, Line 36 asks for the answer. Line 39 gives you the chance to correct the answer if you made a mistake. Line 42 sends you on to the next question.

When you have finished entering the test, Line 45 gives you instructions and Line 48 gets the file name. Line 51 opens communications to the cassette, 54 writes the number of questions and whether they will have answers, and Lines 57 – 69 write the questions and answers. Line 72 closes communications and Line 80 announces the test is saved, and sends you back to the menu.

Line 78 is the start of section three and again gives instructions. Line 81 gets the file name, 84 opens communications from the cassette, and 87 – 102 input the questions and answers. Line 99 checks for the end of the file. If it is reached, Line 105 closes the file. Line 108 lets you know the test has been loaded, and sends you back to the menu.

Lines 111 – 129 take the questions and answers and print them as a review. GOSUB 201 in Line 123 is a delay loop to let you proceed at your own pace. This ends section four.

Line 132 starts section six. Fooled you, didn't I? Thought this should be section five, right? Now we will see who is paying attention. Line 138 prints the questions and 141 asks you for the answer. Lines 144 – 147 let you correct the answer if you have made a mistake and Line 150 sends you to the next question.

When all the questions are done, Line 153 lets you save them on tape and Line 156 acts on your decision.

Now we come to section five, which begins with Line 159. This section merely picks a question at random, prints it in 162, and asks for the answer in Line 165. Line 168 checks the entered answer against the one in memory. It then tells

NUMBER OF QUESTIONS, UP TO 101 2

WILL YOU INCLUDE ANSWERS Y/N? Y
 1 ? WHO WAS THE STAR OF THE ED SULLIVAN SHOW?
 CORRECT Y/N? Y
 AND THE ANSWER IS ? ROY ROGERS
 CORRECT Y/N? Y
 2 ? WHAT IS THE BEST COMPUTER?
 CORRECT Y/N? Y
 AND THE ANSWER IS ? COLOR COMPUTER
 CORRECT Y/N? Y

you if your answer was right or wrong. Line 171 asks if you want to try another question, and 174 acts on your decision. Since the questions are picked by RND and there are no "already asked" flags, the same question may be asked more than once.

Lines 177 – 195 are the instructions in section one, and Line 198 is section seven, the end. Lines 201 – 207 are the GOSUB routine mentioned earlier.

The one problem with this program is that the answers you enter must exactly match those in memory or it will say you are wrong. However, it doesn't keep track of wrong answers.

If you have Extended Basic you can change the Input commands in Lines 27, 36 and 141 to Line Input. This will allow greater freedom in the wording of the questions and answers.

For readers with 4K, I made several cuts so the program would fit. Gone are sections one and seven (Lines 177 – 198, the instructions and the end). Also gone are Lines 30, 39, 144 and 147. This means if you make a mistake you have to Break and start over when entering the questions and when answering. You must also press the Break key to exit the program.

Those changes are also reflected in Lines 3, 6 and 9. Some of the instructions have also been shortened. The net result is a program that takes up 1.1K, leaving about the same free to run the program.

The program can be used to build up a tape library of information that would be especially useful to families with more than one child. The first child will generate the quizzes, which could then be used by the other children as they grow up. Even if the program itself doesn't help in learning, looking up the information and entering it into the program makes it more likely the information will be retained than is likely if the student reads it in a book.

■ ■ ■

♦ Program



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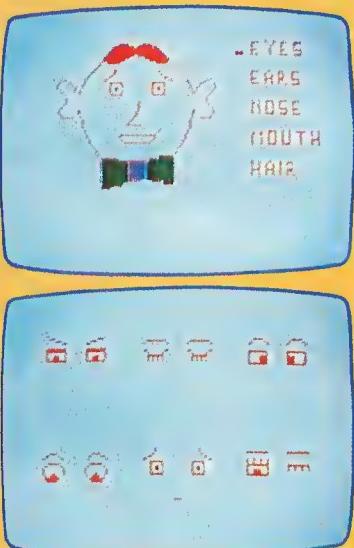
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PRO-COLOR-FILE, PRO-COLOR-DIR,
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Derringer Software

All programs require 32k Color Computer Disk System
(Does not require joysticks!)

Program Listing 2. Generic Test Program for 16K

```
1 CLEAR200 :CLEARMEM-800
3 CLS:PRINT@44,"OPTIONS":PRINT@1
35 , "1-INSTRUCTIONS":PRINT@167 , "2
-NEW QUESTIONS":PRINT@199 , "3-LOA
D FILE":PRINT@231 , "4-REVIEW":PRI
NT@263 , "5-TEST":PRINT@295 , "6-NEW
ANSWERS":PRINT@327 , "7-END"
6 INPUTC:IF C<1 OR C>7THEN6
9 ON C GOTO177,12,78,111,159,132
,198
12 CLS
15 INPUT"NR. OF QUESTIONS, (LIMI
T 10)":A
18 IF A<1OR A>10THEN15
21 INPUT"WILL THERE BE ANSWERS (
Y/N)":E$
24 FOR B=1TOA
27 PRINTB:;INPUT A$(B)
30 INPUT"CORRECT (Y/N)":B$:IF B$=
=Y"THEN33 ELSEIF B$="N"THEN27 E
LSE30
33 IF E$="N"THEN42
36 INPUT"AND THE ANSWER IS ";D$(B)
39 INPUT"CORRECT (Y/N)":B$:IF B$=
=Y"THEN42 ELSEIF B$="N"THEN 36E
LSE39
42 NEXTB
45 CLS:PRINT"NOW, POSITION THE T
APE, PRESS <PLAY> AND <RECORD>
AND ENTER A FILENAME."
48 INPUT C$
51 OPEN"O", #-1,C$
54 PRINT#-1,A,E$
57 FOR B=1TOA
60 PRINT#-1,A$(B)
63 IF E$="N"THEN69
66 PRINT#-1,D$(B)
69 NEXTB
72 CLOSE#-1
75 SOUND1,3:GOTO3
78 CLS:PRINT"PUT TAPE AT RIGHT S
POT, PRESS <PLAY> AND ENTER TH
E FILENAME."
81 INPUT C$
84 OPEN"I", #-1,C$
87 INPUT#-1,A,E$
90 B=1
93 INPUT#-1,A$(B)
96 IF E$<>"N"THENINPUT#-1,D$(B)
99 IF EOF(-1)THEN105
102 B=B+1:GOTO93
105 CLOSE#-1
108 SOUND50,3:GOTO3
```

```

111 CLS
114 FORB=1TOA
117 PRINTA$(B)
120 PRINT"ANSWER : "D$(B)
123 GOSUB201
126 NEXTB
129 GOTO3
132 CLS
135 FOR B=1TOA
138 PRINTA$(B)
141 INPUT"THE ANSWER IS ";D$(B)
144 INPUT"CORRECT (Y/N)";F$
147 IF F$="Y"THEN150 ELSEIF F$="N"THEN141 ELSE144
150 NEXTB
153 INPUT"SAVE THEM ON TAPE (Y/N)";E$
156 IF E$="Y"THEN45 ELSEIF E$="N"THEN3 ELSE153
159 G=RND(A)
162 PRINTA$(G)
165 INPUT"ANSWER-";G$(G)
168 IF G$(G)=D$(G)THENPRINT"CORRECT" ELSEPRINT"WRONG. THE CORRECT ANSWER IS "D$(G)
171 INPUT"ANOTHER (Y/N)";H$
174 IF H$="Y"THEN159ELSE3
177 CLS:PRINT"THIS PROGRAM LETS YOU CREATE CUSTOM QUIZZES AND SAVE THEM ON TAPE WITH LITTLE EFFORT. YOU CAN ASK UP TO 10 QUESTIONS ON ANY SUBJECT. THE QUESTIONS OR THE QUESTIONS AND ANSWERS CAN BE"
180 PRINT"STORED ON TAPE FOR TESTING AND REVIEW OR USED FIRST. THEY CAN BE SPECIFIC OR GENERAL QUESTIONS"
183 GOSUB201
186 CLS:PRINT"TO MAKE A LIST OF QUESTIONS, PRESS 2. TO LOAD A LIST ALREADY MADE, EITHER QUESTIONS OR QUESTIONS AND ANSWERS, PRESS 3. TO REVIEW THE LIST, PRESS 4. TO BE TESTED ON THEM, PRESS 5. IF THE QUESTIONS DON'T HAVE ANSWERS";
189 PRINT"YOU CAN ENTER AND SAVE THEM WITH 6. TO END, PRESS 7."
192 GOSUB201
195 GOTO3
198 CLEAR200:END
201 PRINT"PRESS ANY KEY TO CONTINUE"
204 IF INKEY$=""THEN204
207 RETURN
    ...

```

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Color Computing for Kids



Here's a review table for the last few months, and some new commands and games.

by Jean Plessner

ALWAYS TAKE A LITTLE time at the New Year to think back over the past year. This gives me a chance to re-commit myself to projects as I make lists of new goals and ideas I want to carry into the new year. This made me think of a special list just for you — a review of all the BASIC symbols and commands I've covered since this series started. Refer to the review for anything you've forgotten, or, if you've joined us late, use it to learn what you've missed.

The "BASIC Review" gives us all a fresh start. I always begin a new year by putting things in order and filling my new calendar with dates to remember and promises to myself to make time for self-improvement. And, because I save all kinds of things (newspaper clippings and so on) through the year, I get some folders and large envelopes and go a little crazy with labels for awhile. The labels give me a system for filing so I'll know exactly where to look when I need an item quickly.

Your computer also uses a system of labels for organization, and that brings us to this month's lesson on *variables*. Variables are like labels for information (or data) you store in your computer's memory. You label and store data in a program either because it's used many times in the program or because the data changes and changing a variable's data is easier than changing the data in many lines throughout a program. You'll understand this better as we use variables, but first let's go over the rules for them.

Numeric Variables

To label numbers in a program you can use one or two letters. Any of the letters in the alphabet can be chosen. This program will show you how it's done:

```
10 CLS
20 A=20
30 NZ=10
40 PRINT "A = " A
50 PRINT "NZ = " NZ
60 PRINT "A + NZ = " A+NZ
```

When you RUN the program you'll see that the variable A holds, or represents, the number 20 and the variable NZ holds the number 10. The A and the NZ are "numeric variables" and the numbers 20 and 10 are "numeric data." Any letter could have been used in place of the A and any two letters could have been used in place of the NZ; choosing one or two letter variables is a personal choice — it's really up to you.

The numeric data can be PRINTed in any order you like and it can also be added (+), subtracted (-), multiplied (x), and divided (/). You can also change the data any variable holds without having to change any other line in the program. To change the data, just re-type the variable assignment lines (20 and 30), keeping the variables the same, but add your own numbers after the equals sign.

Now make any changes you want, then RUN the program after each change to see the difference. When you're through experimenting, type NEW and press the ENTER and CLEAR keys so you'll be ready for the next program.

Numeric Variables at Work

1984 is a leap year, giving us an extra day on February 29. If you're like me, with never enough time to do all the things you'd like, that can be a real gift. I think February 29 should be declared a holiday so we can really take advantage of having twenty-four extra hours of free time, but an extra day every four years is

still pretty terrific. Let's see...starting with 1984, how long before we experience an entire extra week?

The variable list for the program is:

Y = the leap year
T = the number of years in-between
D = the number of days in a week
TY = the total number of years for an extra week

And, here's the program:

```
10 CLS:PRINT
20 Y=1980:T=4:D=7
30 PRINT "WE WILL HAVE EXPERIENCED ONE"
40 PRINT "EXTRA WEEK WHEN THESE"
50 PRINT "LEAP YEARS HAVE PASSED--"
60 FOR L=1 TO D
70 Y=Y+T
80 PRINT TAB(10) Y
90 NEXT L
100 TY=D*T
110 PRINT "THAT WILL TAKE" TY "YEARS!!"
120 END
```

Line 10 clears the screen. The colon (:) separates statements on one program line, and the PRINT statement prints a blank line at the top of the screen.

Line 20 assigns values to the variables selected for the variable list.

Lines 30 to 50 PRINT the purpose of the program.

Line 60 is the beginning of the FOR/NEXT loop that will repeat "D" times. The letter L is the loop's variable and the variable D equals seven, for the number of days in a week.

Line 70 calculates the leap year each time the loop repeats.

Line 80 is a PRINT TAB (), which indents the number of spaces within the parentheses () before the computer

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starts PRINTing. The new leap year is PRINTed each time the loop repeats.

Line 90 adds one to the loop's variable L, and sends the computer back to the FOR statement until L = D.

Line 100 calculates the total number of years.

Line 110 is a PRINT statement that will PRINT the value of TY in the middle of the sentence. Data within quotation marks ("") is called string data.

Line 120 tells the computer that your program is finished.

RUN the program and compare the results with each statement so you can see what each line accomplished.

Have you noticed the answer to a computer calculation is put before the equals sign instead of after it? This gives the computer a variable before the calculations are done so the answer can be labeled and stored in memory. Numeric or string data mean nothing to the computer unless you first give it instructions on what to do with it.

How Many...How Long

Because this is the beginning of a year, let's look at some of the ways we spend time. If any of the numbers I've assigned to the variables are different for you, just replace them with your own numbers.

We all eat, some more than others, but on an average we eat three meals a day plus a couple of snacks. Let's see how many times we'll eat this year:

The variable list:

D = the number of days in 1984

M = the number of meals per day

S = the number of snacks per day

TE = total times we eat each year

Now, the program:

```
10 CLS:PRINT  
20 D=366:M=3:S=2  
30 TE=(M+S)*D  
40 PRINT "IF I EAT" M "MEALS A DAY"  
50 PRINT "AND" S "SNACKS, I WILL EAT—"  
60 PRINT TAB(10) TE  
70 PRINT "TIMES THIS YEAR!"
```

Line 30 must be typed exactly as you see it. The computer calculates an equation from left to right, but it does the multiplication and division first, then goes back to do addition and subtraction. To prevent this you must use parentheses around the part of the problem you want calculated first. If we didn't use parentheses () here, the computer would multiply S x D and then add M — this answer would be 735 instead of the correct answer of 1830.

One thousand, eight hundred thirty!! And who says eating isn't America's favorite pastime?

How about sleeping? Do you put in nine hours of zzzzz each night? Type NEW and we'll find out how much time you sleep in a year:

The variable list:

TS = the hours you sleep each night

D = the number of days in a year

YS = hours you sleep in a year

The program:

```
10 CLS:PRINT  
20 TS=9:D=366:YS=TS*D  
30 PRINT TAB(5) "IF I SLEEP" TS "HOURS"  
40 PRINT "EACH NIGHT, I WILL SLEEP" YS  
50 PRINT "HOURS THIS YEAR!!"
```

Type RUN. Three thousand two hundred ninety four hours! How many days is that?

Additions to the variable list:

H = hours in a day

TD = total number of days

Add these lines to your program:

```
60 H=24:TD=INT(YS/H)  
70 PRINT TAB(10) "AND"  
80 PRINT "THAT'S" TD "DAYS!!"
```

Line 70 has a command called an integer function. INT() simply tells the computer you don't want the answer to be a decimal, so the computer does the calculations inside the parentheses and chops off the decimal part of the number. With this function your answer will be 137 days instead of 137.25 days.

Do you want to find out how many weeks that is?

The variables:

W = the number of days in a week

TW = the total number of weeks

And add these program lines:

```
90 W=7:TW=INT(TD/W)  
100 PRINT TAB(6) "OR" TW "WEEKS!!!"
```

You now have enough information to use numeric variables in programs of your own. Using my examples, write programs to figure out how many hours you watch television in a year (that's hours each day times days in a year). How many video games do you play in a year? How many books will you read? And, if you get an allowance each week, how much money will you receive in a year? Just remember that there are 52 weeks and 12 months in a year.

I'm sure you'll soon have many ideas of

your own and you'll find your computer is not only fun but helpful.

String Variables

The rules for making string variables are the same as for numeric variables, but a dollar sign (\$) is always added. When you see the \$, say "string," not "dollar," and remember that string data is anything that you put inside quotation marks.

To see how string variables work, let's turn your computer into a comedian. Type NEW, then enter this program:

```
10 CLS:PRINT  
20 S$="?":K$="KNOCK! KNOCK!"  
30 A$="WHO'S THERE?"  
40 R$="BANANA." :SA$="WHO?"  
50 FOR J=1 TO 2  
60 PRINT K$:PRINT A$:PRINT R$  
70 PRINT R$;" ";"SA$  
80 FOR L=1 TO 31  
90 PRINT S$;  
100 NEXT L  
110 NEXT J  
120 PRINT K$,:PRINT A$,:PRINT "ORANGE."  
130 PRINT "ORANGE" SA$  
140 PRINT "AREN'T YOU GLAD I DIDN'T SAY ";R$  
150 PRINT "AGAIN?"
```

After you RUN this program you'll see the reason for the J loop repeating twice and how the L loop PRINTs a line of question marks. The string data will also be clear to you if you compare the program lines to the printout.

To try "Knock, Knock" jokes of your own, put the word you want to use in R\$ and delete Line 50 and Lines 80 through 150. You delete a line by typing the line number, then pressing the ENTER key.

Adding String Data

String variables can contain numbers also, but arithmetic cannot be done with string data. You must use numeric data for calculations, but you can add strings together. Adding strings means putting string data together using the plus sign. This creates a variety of PRINT statements.

The following "Mix-Up" program comes from my almost ten-year-old son David's imagination. It will give you lots of practice adding and PRINTing string variables.

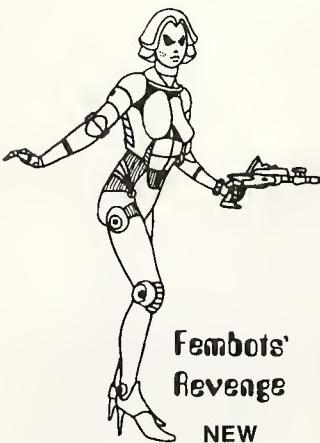
The program has six categories of variables, separated by REMark statements. Each category has six choices and the PRINT statements are made up by using one variable from each category. The variables are added together using the

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Another arcade hit! The Asteroid Belt is crashing down on Earth. You are the first-line defense. You must destroy the blazing asteroids and the homing orbs with your disruptor. Machine-code speed, multi-colors on a black background - the crash and explosions of the asteroids rain on your senses!

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Xygoid NEW

Your ship is being ensnared by the Xygoid Web. Certain death is minutes away! You must blast through the enveloping Web and destroy the Xygoid vessel before you are crushed. This is a multi-colored machine-code game in the highest resolution mode on a black background. Xygoid, from the galactic beginning! It will ensnare your mind!

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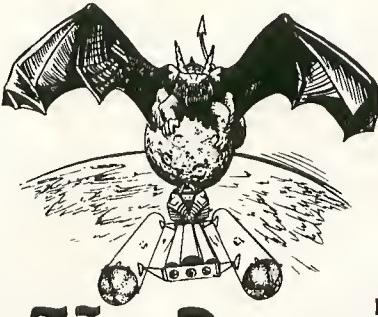


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32K Tape \$19.95

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Fyr-Draca

NEW ARCADE GAME

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Fire Dragons uses the nine color mode to create a screen of dazzling color with a black background and a black border. Dragons swoop from their stellar watch, singly, in groups and in squadron formation. First you face the single wyrms, then the squadron, next the twin giants, followed by the Battle Drake and its minions. Even with four star vessels and shields you will be hard put to survive their spitting fire and diving attacks!

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plus sign and the results are silly mixed-up sentences.

The PRINT statements start with Line 500; there are two statements for each sentence; and, a blank line is PRINTed between. I've given you an example using four different sentences, but in the future you can create your own.

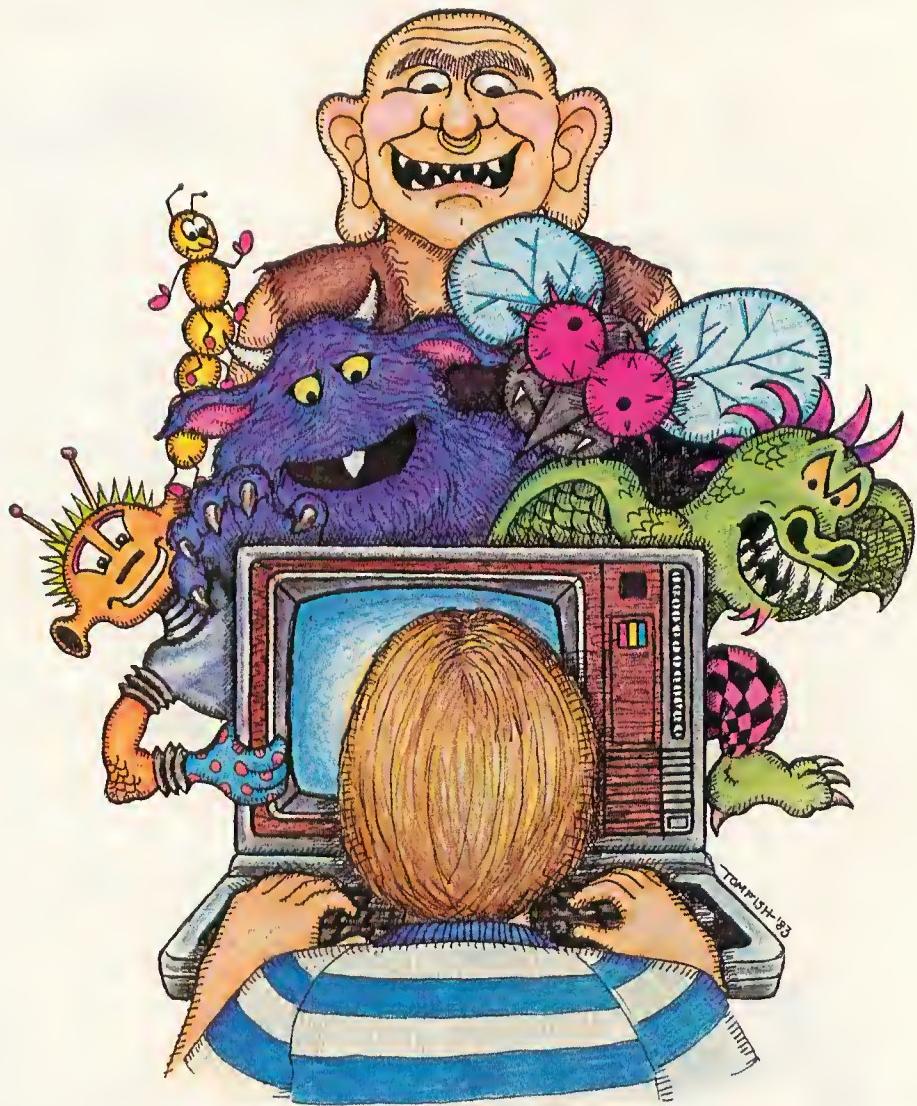
Each time you RUN the program change Lines 500 through 600 using a variable from each category. Select one variable from: AA\$ to AF\$; BA\$ to BF\$; CA\$ to CF\$; DA\$ to DF\$; EA\$ to EF\$; and FA\$ to FF\$. Don't forget to put the plus sign between variables in the PRINT statement, and for the most fun don't look back at the words. Then when you RUN the program your sentences will be silly surprises.

Before you type the "String Mix-Ups" program (Program Listing 1), notice the space before the last quotation mark in all but the last category of variables. The spaces are there to separate the words, so be sure to use them. Also, when you SAVE this program, delete the PRINT statements first so you'll always get a new start each time you load it. And if you get ideas of your own, change the variables or try your own programs.

This lesson on numeric and string variables is leading up to some fun and exciting programming, so get lots of practice. Next month we'll talk back to our computers with the INPUT statement, and also learn to store lots of data in one variable—the DIM statement.

Have a happy, healthy new year and until next month — keep your computer's memory bank full of variables.

■ ■ ■



BASIC Review

Keyboard Characters and Symbols:

ENTER Tells the computer you've ended a line.

BREAK Stops a running program.

CLEAR Clears the screen and returns the cursor to the upper left corner.

SHIFT @ Pauses your running program. Press any key to continue.

SHIFT "Left Arrow" Erases an entire line if ENTER has not been pressed.

"Left Arrow" Backspaces the cursor and erases one character at a time.

? Means the same as the command PRINT.

: Separates statements on a line.

; Tells the computer to continue PRINTing on the same line.

+ Addition, and also combines strings.

- Subtraction.

× Multiplication.

/ Division.

() Tells the computer to do what's inside first.

BASIC Commands:

CLS Clears the screen with green.

CLS () Clears the screen with the color indicated by the number inside the parentheses.

CLOAD Loads a program from tape.

CSAVE Saves a program to tape.

END Tells the computer to end your program.

FOR/NEXT Creates a loop in a program that the computer will repeat the number of times indicated.

GOTO Sends the computer to the line number indicated.

LIST Lists a program on the screen.

LLIST Lists a program on the printer.

PRINT Tells the computer to print whatever follows.

PRINT @ Prints at a specific screen location.

PRINT TAB Indents the number of spaces indicated within parentheses ().

PRINT #—2 Prints on the printer.

REM A remark statement that the computer ignores.

RESET Resets a point to black.

SET Sets a point on the screen at the position and color specified.

SOUND Sounds a specified tone for the duration of time specified.

STEP Causes the FOR/NEXT loop to count by the number that follows the word STEP.

Program Listing. String Mix-Ups

```
10 REM -- STRING MIX-UPS
20 REM -- "A" CATALOGY
30 AA$="THE MONSTER "
40 AB$="THE BUG "
50 AC$="AN ALIEN "
60 AD$="THE FLY "
70 AE$="THE DRAGON "
80 AF$="THE OGRE "
90 REM -- "B" CATALOGY
100 BA$="HAD ROUND "
110 BB$="HAD FURRY "
120 BC$="HAD PRICKLY "
130 BD$="HAD FUZZY "
140 BE$="HAD SCALEY "
150 BF$="HAD CROOKED "
160 REM -- "C" CATALOGY
170 CA$="TOES "
180 CB$="EYES "
190 CC$="FINGERS "
200 CD$="HAIR "
210 CE$="ELBOWS "
220 CF$="TEETH "
230 REM -- "D" CATALOGY
240 DA$="ON "
250 DB$="AND "
260 DC$="WITH 17 "
270 DD$="OVER "
280 DE$="UNDER "
290 DF$="AROUND "
300 REM -- "E" CATALOGY
310 EA$="PURPLE "
320 EB$="POLKA DOTTED "
330 EC$="CHECKERED "
340 ED$="10 "
350 EE$="POINTED "
360 EF$="INVISIBLE "
370 REM -- "F" CATALOGY
380 FA$="FEET!"
390 FB$="SKINNY LEGS!"
400 FC$="HANDS!"
410 FD$="KNOCKED KNEES!"
420 FE$="ELBOWS!"
430 FF$="ELONGATED EARS!"
440 CLS:PRINT:PRINT
450 REM -- PRINT STATEMENTS--
500 PRINT AA$+BD$+CBS
510 PRINT DE$+EC$+FF$ 
520 PRINT
530 PRINT AC$+BA$+CF$ 
540 PRINT DB$+ED$+FD$ 
550 PRINT
560 PRINT AF$+BE$+CA$ 
570 PRINT DD$+EA$+FB$ 
580 PRINT
590 PRINT AD$+BB$+CE$ 
600 PRINT DA$+EF$+FC$
```

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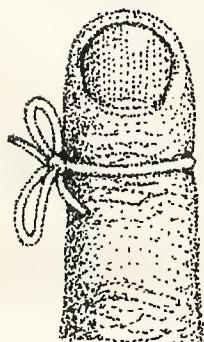
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How To Remember Not To Forget



Keep your computer's eye on important dates and forget the worries that stem from human memory lapse.

HERE ARE SUBROUTINES that will make your date conversions and manipulations less painful. They can be used in any Basic program that requires date manipulations or conversions. These routines will run on any Color Computer with Extended Color Basic.

The subroutines let you change a date from a numeric Julian date to a string MM/DD/YY format and vice versa. The routines will also reduce a Julian date after an add routine (more on that later), and change a month to the Julian day of the first of that month. The routines are numbered beginning with Line 50000 so they can be easily merged with Basic programs that use lower line numbers.

The first subroutine (Lines 50000 – 50140) changes an MM/DD/YY format date into a Julian date. Store the incom-

by Norman Garrett



16K Extended Color Basic

ing date as variable XX\$. The result (a Julian date) is then stored as variable XD, in the format YYDDD. You can then perform addition using the date.

The second subroutine (Lines 50260 – 50540) does the opposite. It changes variable XD (the Julian format date) and output variable XD\$ (MM/DD/YY format).

The second subroutine (Lines 50830 – 50900) reduces a Julian date after a mathematical operation has been performed on it. Since Julian dates are not really decimal numbers, a special routine is needed after they're adjusted. For example, if you want to increment a Julian date (XD) of 83250 (the 250th day of 1983, or September 7, 1983) by 180 days, you would do something like this: 150 XD=XD+180. If XD=83250, the result would be 83430. Since no day above 365 (366 for leap year) is possible, this is an invalid date. This routine would take your date (XD) and adjust it to a valid date. The result of this example would be XD=84065 (March 6, 1984). The value of XD is changed as a result of the subroutine execution. Note: this routine is *not* designed to handle subtractions. Subtracting dates requires a completely different

Program Listing. Date Conversions

```
49991 ' DATE SUBROUTINES
49992 ' BY NORMAN GARRETT
50020 ' CONVERT TO JULIAN
50025 ' XX$=INCOMING DATE
50030 ' MM/DD/YY FORMAT
50040 ' XD=JULIAN DATE
50055 XY$=RIGHT$(XX$,2)
50060 XD=VAL(XY$):XD=XD*1000
50065 W1$=LEFT$(XX$,2)
50070 IF RIGHT$(W1$,1)="/" THEN
50080
50075 GOTO 50085
50080 W1$=LEFT$(W1$,1)
50085 W1=VAL(W1$)

50090 GOSUB 52000
50095 W2$=RIGHT$(XX$,5)
50100 IF LEFT$(W2$,1)="/" THEN 5
0110
50105 GOTO 50120
50110 W2$=MID$(W2$,2,1)
50115 GOTO 50125
50120 W2$=LEFT$(W2$,2)
50125 W2=VAL(W2$)
50130 XD=XD+W2+W1
50135 NG=INT((XD/1000)*1000):IF
XD-NG > 365 THEN GOSUB 50830
50140 RETURN
```

algorithm. These subroutines are designed to be used only in situations where dates need to be incremented. As a general rule, the Julian date reduction subroutine should be executed before converting a Julian date to MM/DD/YY format.

The fourth subroutine (Lines 52005-52125) is used internally, but may also be of value to the user. It translates a month to the number of days preceding it during that year (+1). This lets the computer calculate Julian dates. The input to this routine is W1. Note that a month greater

than 12 will return a value of zero in W1. For example, if I had a value of 14 stored in W1, and executed GOSUB 52005, W1 would contain a value of zero after return from the subroutine.

The possible uses of these date routines are endless. I originally developed them for an auto maintenance program which kept track of items such as when the next oil change was due. There are also many accounting applications where they will be useful.

As noted before, these routines have their limitations. While possibilities for

bells and whistles abound, the routines only perform minimal date editing. Incoming dates should be edited first in the driver program. Also, leap years are not accounted for. If they really matter, you can build a table of leap years. You might also consider a conversion to JAN-DEC format (three character month designations) or even full date formats. As the routines stand, though, they will certainly get the job done with a minimum of bother and ought to come in handy with some of your programming efforts.

```

50270 ' CONVERT FROM JULIAN
50280 ' XD=INCOMMING JULIAN DATE
50290 ' XX$=MM/DD/YY OUTPUT
50295 W3$=STR$(INT(XD/1000))
50300 NG=INT(XD/1000)*1000:W3=XD
-NG
50305 IF W3 < 32 THEN 50375
50310 IF W3 < 60 THEN 50390
50315 IF W3 < 91 THEN 50405
50320 IF W3 < 121 THEN 50420
50325 IF W3 < 152 THEN 50435
50330 IF W3 < 182 THEN 50450
50335 IF W3 < 213 THEN 50465
50340 IF W3 < 244 THEN 50480
50345 IF W3 < 274 THEN 50495
50350 IF W3 < 305 THEN 50510
50355 IF W3 < 335 THEN 50525
50360 W4$="12"
50365 W5$=STR$(W3-334)
50370 GOTO 50535
50375 W4$="1"
50380 W5$=STR$(W3)
50385 GOTO 50535
50390 W4$="2"
50395 W5$=STR$(W3-31)
50400 GOTO 50535
50405 W4$="3"
50410 W5$=STR$(W3-59)
50415 GOTO 50535
50420 W4$="4"
50425 W5$=STR$(W3-90)
50430 GOTO 50535
50435 W4$="5"
50440 W5$=STR$(W3-120)
50445 GOTO 50535
50450 W4$="6"
50455 W5$=STR$(W3-151)
50460 GOTO 50535
50465 W4$="7"
50470 W5$=STR$(W3-181)
50475 GOTO 50535
50480 W4$="8"
50485 W5$=STR$(W3-212)
50490 GOTO 50535

```

```
50495 W4$="9"
50500 W5$=STR$(W3-243)
50505 GOTO 50535
50510 W4$="10"
50515 W5$=STR$(W3-273)
50520 GOTO 50535
50525 W4$="11"
50530 W5$=STR$(W3-304)
50535 XX$=W4$+"/"+RIGHT$(W5$,LEN(W5$)-1)+"/"+RIGHT$(W3$,LEN(W3$)-1)
50540 RETURN
50840 'REDUCE JULIAN DATE
50850 'XD=JULIAN DATE
50860 NG=(INT(XD/1000)*1000):W6=
XD-NG
50870 IF W6<365 THEN 50900
50875 IF W6 < 730 THEN 50890
50880 XD=XD+2000
50885 XD=XD-730:GOTO 50900
50890 XD=XD+1000
50895 XD=XD-365
50900 RETURN
52010 'TRANSLATE MONTH TO DAYS
52020 'W1=NUMERIC MONTH (1-12)
52030 'W1=MONTH (OUTPUT)
52040 'IF W1>12 THEN DAYS=0
52045 IF W1>12 THEN 52120
52050 IF W1<1 THEN 52120
52055 IF W1=1 THEN W1=0
52060 IF W1=2 THEN W1=31
52065 IF W1=3 THEN W1=59
52070 IF W1=4 THEN W1=90
52075 IF W1=5 THEN W1=120
52080 IF W1=6 THEN W1=151
52085 IF W1=7 THEN W1=181
52090 IF W1=8 THEN W1=212
52095 IF W1=9 THEN W1=243
52100 IF W1=10 THEN W1=273
52105 IF W1=11 THEN W1=304
52110 IF W1=12 THEN W1=334
52115 GOTO 52125
52120 W1=0
52125 RETURN
```

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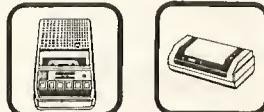
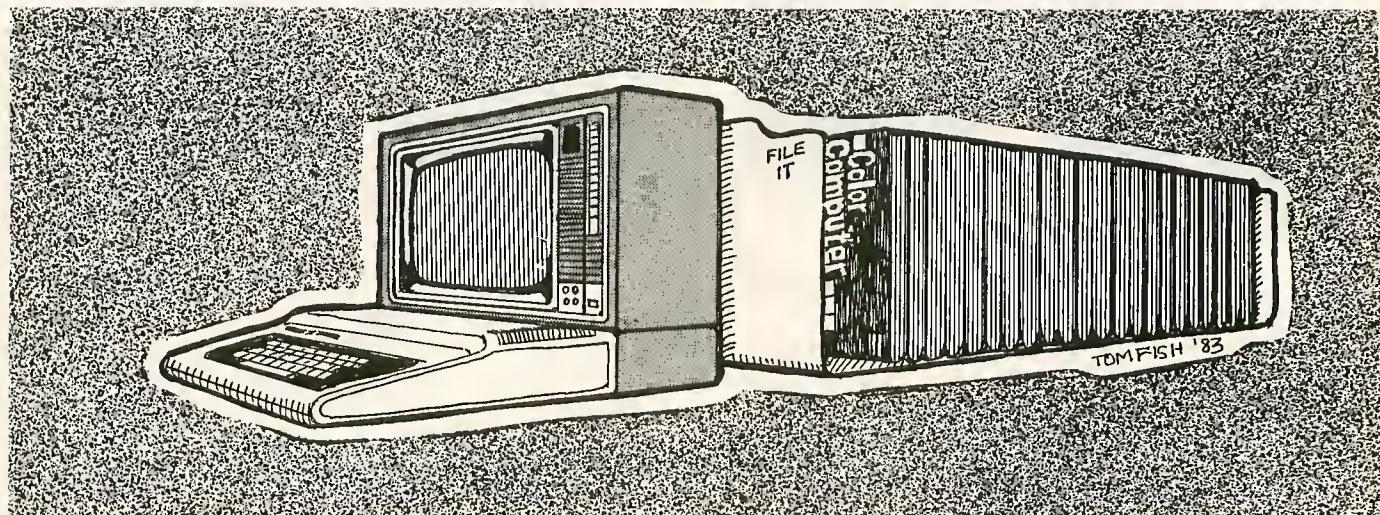
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File It



16K Color Basic

THE COLOR COMPUTER and the TDP 100 are truly fine computers. If you were fortunate enough to receive one as a gift, thank your lucky stars. If you purchased your Color Computer, you most likely comparison-shopped and know you made a good buy. No matter how you got it, be glad for it: after all, it could have been one of those game machines, instead.

Yes, I know the Color Computer is an excellent machine to play games on. I'm sure everyone enjoys playing a good game every now and then, as I do. However, you are probably beginning to ask yourself if game playing is all computing is about.

The answer is a dramatic *no!* Computing and your Color Computer can do many things: you can purchase program software on a wide variety of subjects from games to sophisticated scientific problem solving. You can also write your own programs.

One of the biggest problems for most beginning computerists who want to leave game playing behind and begin writing programs is having to first sort through the great volume of information available. Wouldn't it be nice if you could sort through several magazine articles to

by Keith Baker

find those that dealt with the type of program you wanted to write?

Well, why not let your computer help you? File It will be glad to help you sort, categorize, and generally keep track of almost anything.

What File It Does

File It is one of a type of program commonly called a database manager (DBM). This is a generic term for a family of programs designed to let the user perform a number of activities associated with record-keeping. Some of these activities include sorting, editing, selectively searching, and retrieving data. Of course, there must also be a means of printing and storing the data files.

File It performs these functions, as well as providing several other convenient operations. This program will let you create a file containing five fields of information. You may specify the names of the fields you use.

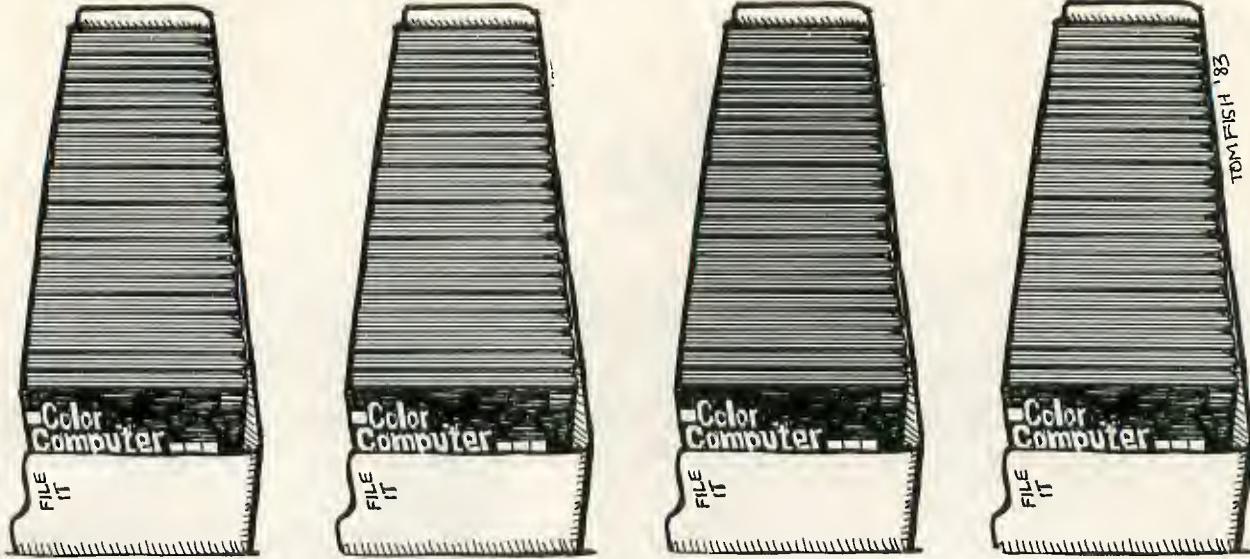
Once you have created the file you can perform alphabetic or numeric sorts on three fields. You can also search for specific data in one of four fields. There are also file maintenance functions, including adding file entries, deleting file entries, and changing existing files. Additional features include viewing the file entries in either a forward or reverse direction, hard copy printout, and file storage on cassette tape.

How To Use File It

Type the program into your computer and CSAVE several copies. Then if you make a typing error and your program is destroyed, you will have a back-up tape to use when debugging typing errors.

As soon as your monitor gives you the OK prompt, you're ready to use the program. Type RUN and press Enter. You should see a title page announcing the title of the program, etc. You will then be asked if you wish to load an existing file tape. Since you have not yet created one of these, hit the N key. This will advance you to the field naming routine.

Give this portion of your program a little thought before going on. You are asked to name five fields; each of these



TOM FISCH '83

fields is related. Let's say you name the first field "Article Name." The second through fifth fields should then have something to do with articles. For example, field two could be called "Article Type." The third and fourth fields could be "Author" and "Article Source." Finally, the fifth field might be "Subject." These field names are just examples, of course. One of the nice things about this program is that you can give the fields any name you like.

This process does not have to be performed each time you use the program. If you had entered Y in response to the question concerning loading an existing file tape, the program would read your tape and automatically reassign the field names you used when you created the file.

File It will now advance you to the main menu. You have six options, including file maintenance, file search, file sort, file print, file save, and file view. Select option 1, File Maintenance.

A submenu will appear presenting three choices. You can add a file, delete a file, or edit a file. I should mention a fourth choice; you can always return to the main menu from any submenu by pressing the R key.

Select function 1, Add File, so you can begin building your data file.

There are two operational conditions to think about as you develop your file. The program as it is now written allows search operations on fields 1, 2, 3, and 4. These fields should contain the information you want to use as specific identifiers.

Also, the sort routine is designed for fields 1, 2, and 3. These fields should contain the information you want to organize alphabetically or numerically.

File It is written entirely in Basic for

ease in making modifications to the program. This can make the sort routine slow at times, if large fields are used in the sort categories. Careful selection of the sort fields will minimize this potential drawback.

This program is easy to use and to modify. I hope you will enjoy it.

Line By Line

Line 0 and 654—PCLEARs all but one graphic page to provide free memory for users with Extended Basic.

Lines 4–14—Program name and author information.

Line 16—Clears string space and dimensions 50 data arrays for each field. File It takes up approximately 8500 bytes of memory, leaving approximately 7500 bytes available to store information. However, because the Color Computer uses a number of bytes in low memory as string descriptors, less space is actually available. The descriptors tell Basic where to find the data you input as strings. The clear and dimension statements I have used should work for 16K machines. However, as your data file grows beyond the 50 entries provided, you may have to experiment to maximize memory use.

Line 20—Defines strings comprising screen displays.

Lines 22–32—Displays title page. Line 22 provides timing for the screen display.

Lines 34–42—Load existing file tape? Directs program flow upon decision.

Lines 44–54—Field naming routine.

Lines 56–78—Presents main menu and directs program flow upon choice.

Lines 80–104—Presents file maintenance submenu and directs program flow upon decision.

Lines 106–158—Add a file entry routine.

Lines 160–198—Delete a file entry routine.

Lines 200–252—File editing routine.

Lines 254–446—Data field search routine. BA\$ = Field 1. BB\$ = Field 2. BC\$ = Field 3. BD\$ = Field 4.

Lines 448–514—Field sorting routines.

A\$ = Field 1. B\$ = Field 2. C\$ = Field 3.

Lines 516–540—Save routine saves data file to tape.

Lines 542–572—Load routine loads existing data file from tape.

Lines 588–608—Print routine. 590 checks to see if printer is on-line. 594 centers file title. 598 prints column headings. 604 prints file entries.

Line 610–618—Keeps field entries together during sorting.

Lines 620–650—View routine, prints file entries to screen.

Modifications—Non-Extended Basic users delete lines 2 and 654. If not using printer option, delete line 66 and lines 588–608, and change line 68 from 6 to 5; line 76 from 6 to 5; and delete the number 588 from line 78.

Modifying File It

File It is easily modified. I see several areas that are logical targets for change.

The first change I wanted to make was to increase the number of fields in a file entry. To do this, you need only add one more variable to the various input, output, and data handling functions. For example, to add a new field, follow the steps listed below:

- Add BF\$ to the field naming routine (lines 44–54). New line 55.

- Add `BF$` to the add file routine (lines 110–126). New line 127.
- Add `F$` to the add file routine (128–140). New line 141.
- Add `F$(RN-RN)` to the delete file routine in 188.
- Add `F$(X)=F$(X+1)` to the delete file routine in 192.
- Change line 228 in the edit function to `L=VAL(L$):IF L <1 or L> 6 THEN 224 ELSE 230.`
- Add ,241 to the edit function line 230.
- Add new line 241: `PRINT BF$": "F$(RN):PRINT:INPUT"CHANGE TO: " ;F$(RN):GOTO242`
- Add `,BF$` to the save file routine in 532.
- Add `,F$(X)` to the save file routine in 536.
- Add `,BF$` to the load file routine in 562.
- Add `,F$(X)` to the load file routine in 568.
- Add a new line 583 to the display routine (574–582). New line: `PRINT" 6: "F$(RN)`
- Add a new tab location (see modifying printout) and `BF$` to line 598.
- Add a new tab location and `F$(X)` to line 604.
- Add `T$(6)=F$(A1)` to line 612.
- Add `F$(A1)=F$(A3)` to line 614.
- Add `F$(A3)=T$(6)` to line 616.
- Add a new line to the view file routine (624–634). New line: `635 PRINT BF$": "F$(X)`

Another modification might be to add or change the field used for searching. To make this modification, all that is necessary is to change the search submenu in lines 258–266 and the corresponding search routine.

To be able to search for field 5(BE\$) instead of field 4(BD\$), change BD\$ in 264 to BE\$, and also change BD\$ in 392 and 396 to BE\$. To complete the modification change D\$ to E\$ in 398 and 406.

The sorting routine can be changed in almost the same fashion. First change the sort submenu in lines 426 – 432. Then change line 458, 482, or 504 to the field on which you want to sort.

One other major modification comes to mind. The heart of a data base manager is the ability to obtain a print out of the information in a format you choose. To make changes in the print format the user must be familiar with the commands used by his printer and with the basics of the tab function.

File It, as it is now written, relies on only the most basic formatting requirements. An 80-character per line printer is required. Since there are five fields of data for each file, the 80 characters of printer width are divided by five to determine the number of character spaces that can be used in each column. The result is 16 characters per column. This produces all the columns at the same width. However, so long as we remember that if we add more characters to a fields column we have to take some away from one of the others, this isn't important. Remember, there are only 80 spaces total available.

The print out's title is the title assigned to the file when a copy is saved to tape.

If you print a file without first saving a copy to tape, no title will be printed. This was done to remind you to save a copy of your file before turning off your computer. I hate having to retype data entries, don't you?

The title is centered on the page by lines 594 and 596. Line 594 counts the number of characters in the title and divides it by two. It then counts back from the center of the page (40) by half the title's width and sets a tab. Line 596 tabs to the location set by 594 and prints the title.

The column headings are the same as the field entry titles. These are positioned over the data columns by the tab settings in line 598. The columns are 16 characters wide with the exception of column five, which is only 12 characters wide. The first column is set in four spaces from the left edge of the page. Therefore, four character spaces are deleted from the right side.

The data columns are also 16 characters wide. However, they are set in from the edge of the page by only three character widths. Since each of the headings and data entries is left-justified in its column, the image of centering is achieved.

Modification is simply a matter of adjusting the tab locations to achieve column widths that meet your requirements. As with all programming efforts, attention to detail is the main thing to keep in mind when making modifications. Don't be afraid to give it a try. ■ ■ ■

Program Listing. File It

```

2 GOTO654
4 REM #           FILE IT      #
6 REM #DATA MANAGEMENT PROGRAM#
10 REM# BY        KEITH BAKER   #
12 REM#          #
14 REM#          #
16 CLEAR5500:DIMA$(50),B$(50),C$(
(50),D$(50),E$(50)
18 CLS3
20 S$=" "+STRING$(30,"*"):R$=STR
ING$(80,"*"):U$=" *"+STRING$(28,
" ")+ "*"
22 FORX=1TO50
24 PRINT@160,S$:PRINT@192,"      FILE IT"
26 PRINT@224,"      DATA MANAGEME
NT PROGRAM"
28 PRINT@256,"          BY KEITH
BAKER"
30 PRINT@288,S$
```

```

32 NEXTX
34 CLS:PRINT@224,"      LOAD AN
EXISTING FILE?":PRINT@256,"PRESS
<Y> FOR YES OR <N> FOR NO."
36 L$=INKEY$ :IFL$=""THEN 36
38 IFL$="y"ORL$="Y"THEN 542
40 IFL$="n"ORL$="N"THEN 44
42 GOTO 36
44 CLS:PRINT"      FIELD NAMING FU
NCTION":PRINT:PRINT
46 LINEINPUT"FIELD 1 NAME:";BA$
48 LINEINPUT"FIELD 2 NAME:";BB$
50 LINEINPUT"FIELD 3 NAME:";BC$
52 LINEINPUT"FIELD 4 NAME:";BD$
54 LINEINPUT"FIELD 5 NAME:";BE$
56 CLS3:PRINT@96,S$:PRINTU$
58 PRINT" *      1> FILE MAINTAINC
E      *"
60 PRINT" *      2> SEARCH FILE
      *"
```

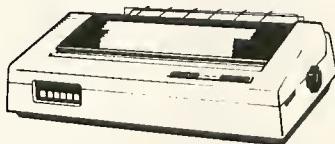
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```

62 PRINT" *      3> SORT FILE
      *"
64 PRINT" *      4> SAVE FILE
      *"
66 PRINT" *      5> PRINT FILE
      *"
68 PRINT" *      6> VIEW FILE
      *"
70 PRINTU$ : PRINTS$ : PRINT" "REC
" FILE/S NOW IN MEMORY" : SOUND220
,1

72 L$=INKEY$ : IFL$="" THEN 72
74 L=VAL(L$)
76 IFL<1ORL>6 THEN 72 ELSE 78
78 ONL GOTO80,254,424,516,588,62
0
80 REM FILE MAINTAINCE
82 CLS 3 : PRINT@160,S$ : PRINTU$
84 PRINT" *      1> ADD FILE
      *"
86 PRINT" *      2> DELETE FILE
      *"
88 PRINT" *      3> EDIT FILE
      *"
90 PRINT" *      R> RETURN MAIN ME
NU
      *"
92 PRINTU$ : PRINTS$
94 SOUND220,1
96 L$=INKEY$ : IFL$="" THEN 96
98 IFL$="r" ORL$="R" THEN 56
100 L=VAL(L$)
102 IFL=1ORL=2ORL=3 THEN 104 ELSE 96

104 CLS : ONL GOTO106,160,200
106 REM ADD A LISTING
108 REC=REC+1
110 CLS1 : PRINTS$
112 PRINT" *          ADD A FILE
      *"
114 PRINTS$
116 PRINT"          FILE NUMBER:"R
EC : PRINT
118 PRINT"ENTER "BA$" ":" ;:LINEIN
PUTA$(REC)
120 PRINT"ENTER "BB$" ":" ;:LINEIN
PUTB$(REC)
122 PRINT"ENTER "BC$" ":" ;:LINEIN
PUTC$(REC)
124 PRINT"ENTER "BD$" ":" ;:LINEIN
PUTD$(REC)
126 PRINT"ENTER "BE$" ":" ;:LINEIN
PUTE$(REC)
128 CLS
130 PRINT"          FILE NUMBER:"R

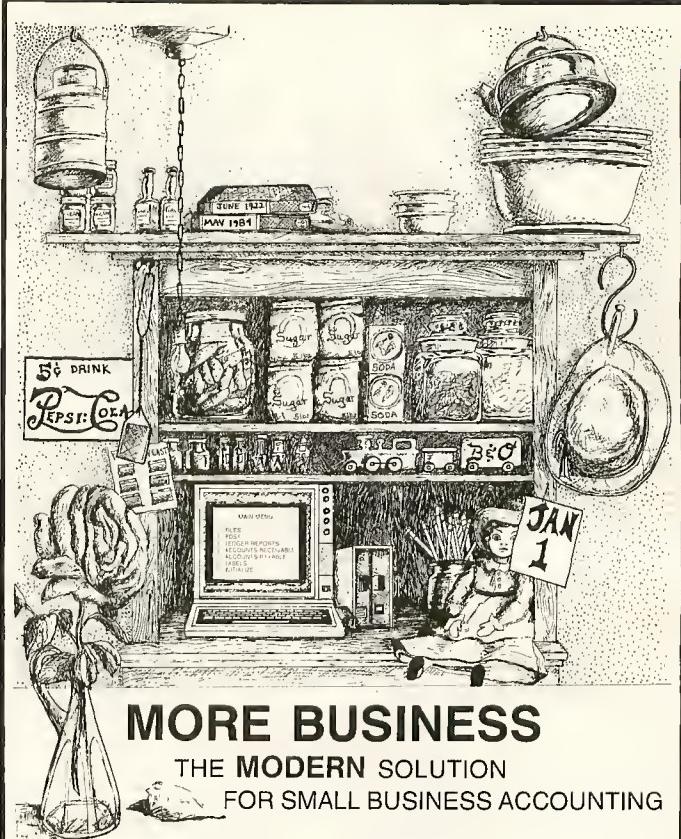
```

```

EC:PRINT
132 PRINTBA$" :"A$(REC)
134 PRINTBB$" :"B$(REC)
136 PRINTBC$" :"C$(REC)
138 PRINTBD$" :"D$(REC)
140 PRINTBE$" :"E$(REC)
142 PRINT:PRINT" IS THIS CORRECT
(y/n)"
144 AN$=INKEY$: IFAN$="" THEN144
146 IFAN$="Y" ORAN$="Y" THEN150
148 IFAN$="N" ORAN$="N" THENRN=REC
:CLS:GOTO220
150 CLS3:PRINT@192," INPUT <A>
ANOTHER OR <R>
RETURN TO MENU"
152 L$=INKEY$: IFL$="" THEN152
154 IFL$="A" ORL$="A" THENREC=REC+
1:GOTO110
156 IFL$="R" ORL$="R" THEN56
158 GOTO152
160 REM DELETE A FILE
162 CLS(7):PRINT@0,"ENTER <R> TO
RETURN TO MAIN MENU":PRINT@192,
S$
164 PRINT" *           DELETE A FIL
E      *"
166 PRINTS$
168 PRINT:INPUT" FILE NUMBER TO
BE DELETED:";RN$
170 IFRN$="R" ORRN$="R" THEN56 ELSE
172
172 RN=VAL(RN$):IFRN>REC ORRN<1T
HEN162
174 CLS:PRINT@32,"          DELE
TE FUNCTION":GOSUB574
176 PRINT" CORRECT LISTING (y/n)
"
178 L$=INKEY$: IFL$="" THEN178
180 IFL$="Y" ORL$="Y" THEN188
182 IFL$="N" ORL$="N" THEN160
184 IFL$="R" ORL$="R" THEN56
186 GOTO178
188 A$(RN)=A$(RN-RN):B$(RN)=B$(R
N-RN):C$(RN)=C$(RN-RN):D$(RN)=D$(
RN-RN):E$(RN)=E$(RN-RN)
190 CLS:FORX=1TO100:PRINT@232,"R
ECORD DELETED":NEXTX:FORX=RN TOR
EC
192 A$(X)=A$(X+1):B$(X)=B$(X+1):
C$(X)=C$(X+1):D$(X)=D$(X+1):E$(X)
=E$(X+1)
194 NEXTX
196 REC=REC-1:IFREC<1THENREC=0
198 GOTO56
200 REM EDIT A FILE

```

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202 CLS7:PRINT@0,"ENTER <R> TO RETURN TO MAIN MENU":PRINT@192,\$\$
204 PRINT" * EDIT A FILE
*"
206 PRINTS\$
208 PRINT:INPUT" FILE NUMBER TO BE EDITED :";RN\$
210 IFRN\$="R"ORRN\$="r"THEN56 ELSE
212 RN=VAL(RN\$):IFRN<1ORRN>REC THEN214 ELSE218
214 CLS:FORX=1TO100:PRINT@256," RECORD NUMBER OUT OF RANGE":NE
XTX
216 GOTO56
218 CLS:PRINT@32,"
IT FUNCTION"
220 GOSUB574
222 PRINT" EDIT WHICH FIELD ?"
224 L\$=INKEY\$:IFL\$=""THEN224
226 IFL\$="r"ORL\$="R"THEN56
228 L=VAL(L\$):IFL<1ORL>5THEN224 E
LSE230
230 CLS:ONL GOTO232,234,236,238,
240
232 PRINTBA\$":A\$(RN):PRINT:LIN
EINPUT"CHANGE TO: ";A\$(RN):GOTO2
42
234 PRINTBB\$":B\$(RN):PRINT:LIN
EINPUT"CHANGE TO: ";B\$(RN):GOTO2
42
236 PRINTBC\$":C\$(RN):PRINT:LIN
EINPUT"CHANGE TO: ";C\$(RN):GOTO2
42
238 PRINTBD\$":D\$(RN):PRINT:LIN
EINPUT"CHANGE TO: ";D\$(RN):GOTO2
42
240 PRINTBE\$":E\$(RN):PRINT:LIN
EINPUT"CHANGE TO: ";E\$(RN):GOTO2
42
242 CLS:GOSUB574
244 PRINT" IS THIS CORRECT (y/n) ?"
246 L\$=INKEY\$:IFL\$=""THEN246
248 IFL\$="y"ORL\$="r"ORL\$="Y"ORL\$="R"THEN56
250 IFL\$="n"ORL\$="N"THENCLS:GOTO
222
252 GOTO246
254 REM SEARCH ROUTINE
256 CLS0:PRINT@128,\$\$:PRINTU\$
258 PRINT" 1> SEARCH BY "BA\$
260 PRINT" 2> SEARCH BY "BB\$
262 PRINT" 3> SEARCH BY "BC\$

```

264 PRINT"    4> SEARCH BY "BD$  

266 PRINT"    R> RETURN TO MENU  

268 PRINTU$:PRINTS$:SOUND220,1  

270 L$=INKEY$:IFL$=""THEN270  

272 IFL$="r"ORL$="R"THEN56  

274 L=VAL(L$)  

276 IFL<1ORL>4THEN270ELSE278  

278 CLS:ONL GOTO280,316,352,388  

280 REM SEARCH  

282 CLS:PRINTS$  

284 PRINT"      SEARCH FOR "BA$  

286 PRINTS$  

288 PRINT"ENTER "BA$" FOR SEARCH  

":LINEINPUTSR$  

290 M=0:N=0:FORRN=N TOREC:IFSR$=  

A$(RN)THEN292ELSE294  

292 M=M+1  

294 NEXTRN  

296 CLS1:FORRN=N TOREC:PRINT@32,  

"      SEARCH FUCTION"  

298 IFSR$=A$(RN)THENGOSUB574ELSE  

312  

300 PRINT"THERE IS/ARE "M" FILE/  

S MEETING YOUR SPECIFICATIONS.  

IS THIS THE ONE YOU WANT <y/n>  

?"  

302 L$=INKEY$:IFL$=""THEN302  

304 IFL$="n"ORL$="N"THEN312  

306 IFL$="r"ORL$="R"THEN56  

308 IFL$="y"ORL$="Y"GOSUB652  

310 GOTO302  

312 NEXTRN  

314 CLS:PRINT@201,"FILE NOT FOUN  

D":FORX=1TO300:NEXTX:GOTO56  

316 REM SEARCH  

318 CLS:PRINTS$  

320 PRINT"      SEARCH FOR "BB$  

322 PRINTS$  

324 PRINT"ENTER "BB$" FOR SEARCH  

":LINEINPUTSR$  

326 M=0:N=0:FORRN=N TOREC:IFSR$=  

B$(RN)THEN328ELSE330  

328 M=M+1  

330 NEXTRN  

332 CLS1:FORRN=N TOREC:PRINT@32,  

"      SEARCH FUNCTION"  

334 IFSR$=B$(RN)THENGOSUB574ELSE  

348  

336 PRINT"THERE IS/ARE "M" FILE/  

S MEETING YOUR SPECIFICATIONS. I  

S THIS THEONE YOU WANT <y/n>?"  

338 L$=INKEY$:IFL$=""THEN338  

340 IFL$="n"ORL$="N"THEN348  

342 IFL$="y"ORL$="Y"GOSUB652  

344 IFL$="r"ORL$="R"THEN56

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346 GOTO338
348 NEXTRN
350 CLS : PRINT@201,"FILE NOT FOUN
D":FORX=1TO500:NEXTX:GOTO56
352 REM SEARCH
354 CLS : PRINTS$
356 PRINT"           SEARCH FOR "BC$"
358 PRINTS$
360 PRINT"ENTER "BC$" FOR SEARCH
":LINEINPUTSR$
362 M=0:N=0:FORRN=N TOREC:IFSR$=
C$(RN)THEN364ELSE366
364 M=M+1
366 NEXTRN:CLS1:FORRN=N TOREC
368 PRINT@32,"           SEARCH FU
NCTION"
370 IFSR$=C$(RN)THENGOSUB574ELSE
384
372 PRINT"THERE IS/ARE "M" FILE/
S MEETING YOUR SPECIFICATIONS. I
S THIS THEONE YOU WANT <y/n>"?
374 L$=INKEY$:IFL$=""THEN374
376 IFL$="n"ORL$="N"THEN384
378 IFL$="r"ORL$="R"THEN56
380 IFL$="y"ORL$="Y"GOSUB652
382 GOTO374

384 NEXTRN
386 CLS : PRINT@201,"FILE NOT FOUN
D":FORX=1TO500:NEXTX:GOTO56
388 REM SEARCH
390 CLS : PRINTS$
392 PRINT"           SEARCH FOR "BD$"
394 PRINTS$
396 PRINT"ENTER "BD$" FOR SEARCH
":LINEINPUTSR$
398 M=0:N=0:FORRN=N TOREC:IFSR$=
D$(RN)THEN400ELSE402
400 M=M+1
402 NEXTRN
404 CLS : FORRN=N TOREC:PRINT@32,"
SEARCH FUNCTION"
406 IFSR$=D$(RN)THENGOSUB574ELSE
420
408 PRINT"THERE IS/ARE "M" FILE/
S MEETING YOUR SPECIFICATIONS. I
S THIS THEONE YOU WANT <y/n>"?
410 L$=INKEY$:IFL$=""THEN410
412 IFL$="n"ORL$="N"THEN420
414 IFL$="r"ORL$="R"THEN56
416 IFL$="y"ORL$="y"GOSUB652
418 GOTO410
420 NEXTRN
422 CLS : PRINT@201,"FILE NOT FOUN

```

```

D":FORX=1TO500:NEXTX:GOTO56
424 CLS(4):PRINT@160,S$:PRINTU$
426 PRINT"      1> SORT BY "BA$"
428 PRINT"      2> SORT BY "BB$"
430 PRINT"      3> SORT BY "BC$"
432 PRINT"      R> RETURN TO MAIN MENU"
N MENU"
434 PRINTU$:PRINTSS
436 SOUND220,1
438 L$=INKEY$:IFL$=""THEN 438
440 IFL$="r"ORL$="R"THEN56
442 L=VAL(L$)
444 IFL>0ANDL<4THEN446ELSE438
446 CLS:ONL GOTO448,472,494
448 REM SORT
450 CLS4:PRINT@192,"          DO
SORTING":PRINT@352,"          NOT DISTURB"
452 A2=REC
454 IFA2<=2THEN470
456 A3=0:FORA1=1TOA2-1
458 IFA$(A1)<=A$(A1+1)THEN464
460 A3=A1+1
462 GOSUB610
464 NEXTA1
466 A2=A3:GOTO454
468 GOTO454
470 GOTO56
472 REM SORT
474 CLS4:PRINT@192,"          DO
SORTING":PRINT@352,"          NOT DISTURB"
476 A2=REC
478 IFA2<=2THEN492
480 A3=0:FORA1=1TOA2-1
482 IFB$(A1)<=B$(A1+1)THEN488
484 A3=A1+1
486 GOSUB610
488 NEXTA1
490 A2=A3:GOTO478
492 GOTO56
494 REM SORT
496 CLS(4):PRINT@192,"          D
SORTING":PRINT@352,"          NOT DISTURB"
498 A2=REC
500 IFA2<=2THEN514
502 A3=0:FORA1=1TOA2-1
504 IFC$(A1)<=C$(A1+1)THEN510
506 A3=A1+1
508 GOSUB610
510 NEXTA1
512 A2=A3:GOTO500

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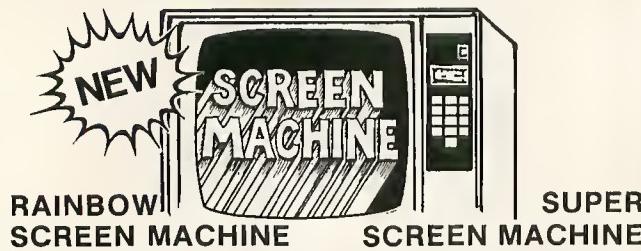
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514 GOTO56

516 CLS 3:PRINT@192," INSERT DATA TAPE INTO RECORDER"

518 PRINT" REWIND THE RECORDER"

520 PRINT" PRESS PLAY AND RECORD"

522 INPUT"NAME OF THIS FILE";DA\$:PRINT:PRINT

524 L=LEN(DA\$)/2:C=207-L

526 CLS :PRINT@140,"SAVING"

528 PRINT@C,DA\$:PRINT@266,"DATA FILE"

530 OPEN"O",#-1,DA\$

532 PRINT#-1,BA\$,BB\$,BC\$,BD\$,BE\$

534 FORX=1TO150:IFA\$(X)=" THEN54 0

536 PRINT#-1,A\$(X),B\$(X),C\$(X),D\$(X),E\$(X)

538 NEXTX

540 CLOSE#-1:GOTO56

542 CLS 3:PRINT@192," INSERT DATA TAPE INTO RECORDER"

544 PRINT" REWIND THE RECORDER"

546 PRINT" PRESS PLAY"

548 INPUT"ENTER FILE NAME";DA\$ IFDA\$="r"ORDA\$="R"THEN56 ELSE

552

552 L=LEN(DA\$)/2:C=207-L

554 CLS :PRINT@139,"LOADING"

556 PRINT@C,DA\$

558 PRINT@266,"DATA FILE"

560 OPEN"I",#-1,DA\$

562 INPUT#-1,BA\$,BB\$,BC\$,BD\$,BE\$

564 FORX=1TO150

566 IFEEOF(-1)THEN572

568 INPUT#-1,A\$(X),B\$(X),C\$(X),D\$(X),E\$(X)

570 NEXTX

572 CLOSE#-1:REC=X-1:GO'TO56

574 PRINT" 1: "A\$(RN)

576 PRINT" 2: "B\$(RN)

578 PRINT" 3: "C\$(RN)

580 PRINT" 4: "D\$(RN)

582 PRINT" 5: "E\$(RN)

584 PRINT" THIS IS RECORD # ";RN:PRINT"PRESS <R> TO RETURN TO MAIN MENU

586 RETURN

588 REM PRINT ROUTINE

590 PS=PEEK(65314):IFPS=4ORPS=6T HEN 594 ELSE 592

```

592 CLS:PRINT@160,"PRINTER NOT O
N-LINE.....":PRINT:PRINT:P
RINT:LINEINPUT"PRESS ENTER WHEN
ON-LINE.":X$:GOTO590
594 CLS:L=LEN(DA$)/2:C=40-L
596 PRINT#-2,TAB(C)DA$:PRINT#-2,
TAB(3)R$
598 PRINT#-2,TAB(4)BA$TAB(20)BB$
TAB(36)BC$TAB(52)BD$TAB(68)BE$
600 PRINT#-2,TAB(3)STRING$(80,"-
")
602 FORX=1TOREC
604 PRINT#-2,TAB(1)A$(X)TAB(16)B
$(X)TAB(32)C$(X)TAB(48)D$(X)TAB(
64)E$(X)
606 NEXTX
608 CLS:GOTO56
610 REMSORT ROUTINE
612 T$(1)=A$(A1):T$(2)=B$(A1):T$(
3)=C$(A1):T$(4)=D$(A1):T$(5)=E$(
A1)
614 A$(A1)=A$(A3):B$(A1)=B$(A3):
C$(A1)=C$(A3):D$(A1)=D$(A3):E$(A
1)=E$(A3)
616 A$(A3)=T$(1):B$(A3)=T$(2):C$(
A3)=T$(3):D$(A3)=T$(4):E$(A3)=T
$(5)
618 RETURN
620 REM VIEW ROUTINE
622 CLS:FORX=1TOREC:PRINT:PRINT
624 CLS:PRINT@32,"           THIS IS
FILE#"X
626 PRINTBA$":A$(X)
628 PRINTBB$":B$(X)
630 PRINTBC$":C$(X)
632 PRINTBD$":D$(X)
634 PRINTBE$":E$(X)
636 PRINT:PRINT:PRINTSS:PRINT"
PRESS (N) FOR NEXT FILE":PRINT
" PRESS (R) FOR RETURN TO MENU":P
PRINT" PRESS (L) FOR PRECEDING F
ILE":PRINTSS
638 L$=INKEY$:IFL$=""THEN638
640 IFL$="n"ORL$="N"THEN646
642 IFL$="r"ORL$="R"THEN56
644 IFL$="l"ORL$="L"THENX=X-1:SO
UND220,1:IFX=0THEN648ELSE624
646 CLS:SOUND220,1:NEXTX
648 CLS:FORX=1TO150:PRINT@256,"
FILES COMPLETED":NEXTX
650 GOTO56
652 PRINT"GLAD I COULD HELP! PR
ESS <R> TO RETURN TO THE MAIN ME
NU":RETURN
654 PCLEAR1:GOTO16
    ■■■

```

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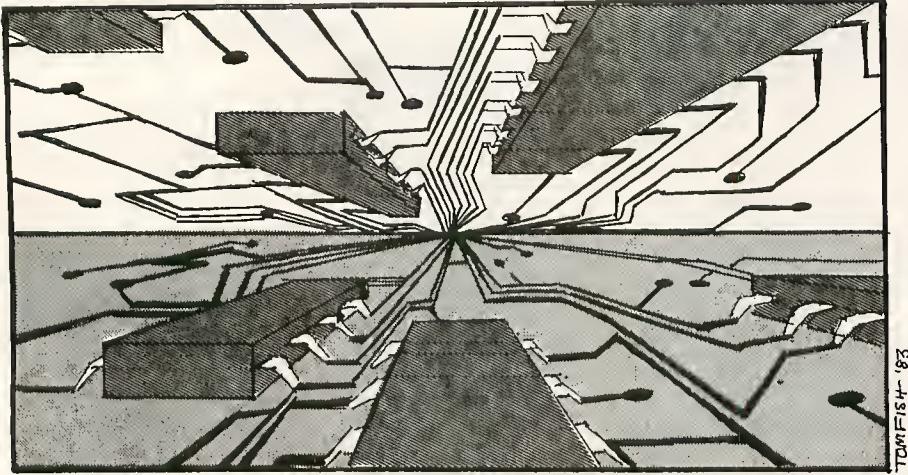
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Stepper

Step through programs as slowly as you like.



by Dave Jenkins



16K Extended Color Basic

EXTENDED COLOR Basic includes a very helpful debugging routine that prints each line number of a Basic program to the screen as it is executed. The user can then spot the troublesome lines.

However, this routine runs very quickly, making it difficult to determine which line is the troublemaker. By the time I spotted a bug the program had executed another 10 lines. Also, the tracer printed the line number wherever the next print location happened to be, destroying any special layouts or graphics on the text screen. I wanted to modify Basic to step through the program a line at a time and wait for the user to press a key to continue. The program would then report the number of the next line to be executed.

Microsoft placed branches from the ROM to the RAM in vital areas. Under Basic, these RAM locations cause the program to jump back to the ROM from whence it came. Extended and Disk Basic place new instructions in these RAM locations to jump to routines in the new ROM. Program execution is along the lines of old ROM — RAM — new ROM — old ROM.

Changing Basic

When the computer receives the TRON command it stores a value at \$AF.

While a program is running, Basic checks this flag. If the tracer is on, it prints a left bracket, line number and right bracket. If the tracer is off, it skips this routine.

If the tracer is on, the Stepper intercepts Basic as it is about to print the left bracket. (Actually, Basic goes to this routine before printing anything.) If a left bracket is to be printed the routine sends a new print position to Basic. The left bracket and line number are then printed. The line number printed will be the *next* line to be executed. When the Stepper intercepts a right bracket, the end of the trace, the bracket is printed. The Stepper then restores the old print position and waits until a key is pressed. If the tracer is off no action is taken. Since the Stepper only works with the tracer on, the TRON and TROFF commands control the Stepper.

Look at the Program Listing: first, the Stepper looks at the tracer flag. If it is off (set to zero), the Stepper immediately returns to Basic. Otherwise the Stepper looks for a left bracket. The left bracket is value \$5B, printed from the A register. If A is not \$5B the Stepper looks for a right bracket.

When the Stepper finds a left bracket it follows several steps. Since we will use the X register we'll save the current contents on the hardware stack. Next, the old print position is fetched from RAM address \$88 and stored in high RAM.

Then the new print address is placed at \$88. The old X register is pulled off the stack and the program returns to Basic.

Basic prints the line number, then gets ready to print a right bracket. Again the Stepper intervenes; the Stepper prints the right bracket and restores the old print position.

A routine to check for a key pressed before going to the next Basic line worked very well, except for one side-effect: it disabled the Break key and INKEY\$ keyboard scans. The only way to stop program execution was by using the Reset button. Since Reset clears the text screen, any information on it was lost. I replaced the key-scanning routine with a simple delay loop. The Break key, INKEY\$ scans and Shift @ keys will work to halt execution. However, you must hold these keys down long enough for the Stepper to return to Basic where they will be recognized. Listings requiring use of the Reset button, and Listings with the delay loop, are included with this article.

When the Stepper returns to Basic, Basic will still attempt to print a character. Register A is loaded with \$1E, which does not print to the screen. After either the keyboard scan or delay loop, the old X register is retrieved and control returns to Basic.

The Basic programs are simply loaders for the machine code. Either version requires only 56 bytes. Since the tracer is only an Extended or Disk Basic function, the Stepper will not work on regular Basic.

What It Isn't

You cannot use the Stepper and watch hi-res graphics at the same time. The computer automatically switches to the text screen whenever it prints on the screen.

Since the Stepper looks for left and right brackets for operation, any program which prints these characters will be affected. The program will not crash, but the Stepper will assume a trace is coming and change the printing position. I have not yet found a program that used these characters. Any that do could be changed to parentheses, or you could use the unmodified tracer.

These limitations apply only when the tracer is on. When the tracer is off, Basic skips the Stepper altogether.

An important note — save the Basic program to disk or tape before running it. If you want a machine language file of the program on tape, type: CSAVE "STEP PER", &H3FC7, &H3FFD, &H3FC7. Before CLOADing, reserve high RAM with: CLEAR 200, 16326. CLOADM the Stepper. Then: POKE 360, 63: POKE 361, 199.

THE Color Computer

MAGAZINE

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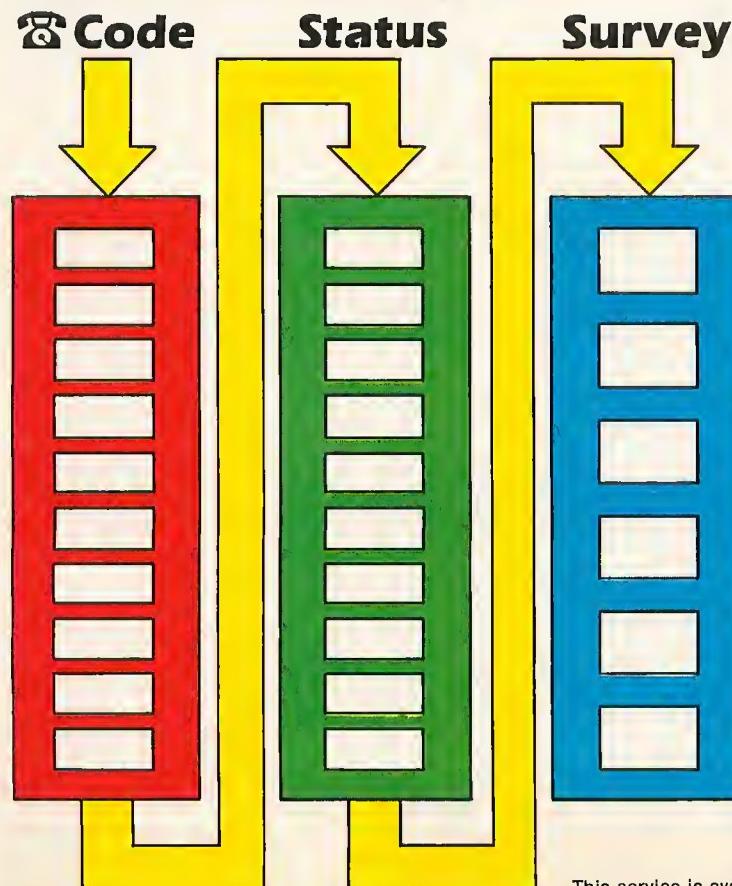
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Reader Survey

- A. What is your present system's memory capacity?
 1. 64K 2. 32K 3. 16K 4. 4K
- B. Is your system configured for:
 1. Color Basic 2. Extended Color Basic 3. OS/9 4. Basic 09?
- C. Do you own:
 1. Disk drives 2. Printer
 3. Modem 4. Joysticks 5. Multi-pak interface
 6. Plotter 7. Light pen?
- D. What do you plan to buy during the next six months?
 1. More memory 2. Upgraded ROM 3. Printer
 4. Modem 5. Disk drives 6. Multi-pak interface
- E. What do you use your computer for?
 1. Adult learning tool 2. Child's learning tool
 3. Small business or home management
 4. Games 5. Programming
- F. In reading **The Color Computer Magazine**, what are your major editorial interests?
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Program Listing. Stepper with pause until keystrike (requires Reset to stop Basic).

```

3 FC7          00200      ORG    $3 FC7
3 FC7 7D      00 AF     00210  START   TST    >$AF
3 FCA 27      2F         00220      BEQ    RETURN
3 FCC 81      5B         00230      CMPA   #$5B
3 FCE 26      12         00240      BNE    NEXT
3 FD0 34      10         00250      PSHS   X
3 FD2 BE      0088       00260      LDX    >$88
3 FD5 BF      3FFE       00270      STX    $3 FFE
3 FD8 8E      05 F9     00280      LDX    #$5F9
3 FDB BF      0088       00290      STX    >$88
3 FDE 35      10         00300      PULS   X
3 FE0 20      19         00310      BRA    RETURN
3 FE2 81      5D         00320  NEXT   CMPA   #$5D
3 FE4 26      15         00330      BNE    RETURN
3 FE6 BD      A285       00340      JSR    $A285
3 FE9 34      10         00350      PSHS   X
3 FEB BE      3FFE       00360      LDX    $3 FFE
3 FEE BF      0088       00370      STX    >$88
3 FF1 AD      9F A000   00380  KEY    JSR    [$A000]
3 FF5 27      FA         00390      BEQ    KEY
3 FF7 86      1E         00400      LDA    #$1E
3 FF9 35      10         00410      PULS   X
3 FFB 7E      8273       00420  RETURN  JMP    $8273
3 FC7          00430      END    START
00000 TOTAL ERRORS

```

KEY	3FF1
NEXT	3FE2
RETURN	3FFB
START	3FC7

Program Listing. Basic Loader for Stepper with pause.

```

90 CLEAR 200, 16326
100 FOR X= 16327 TO 16381
110 READ Y : A= A + Y : POKE X,Y
: NEXT
120 IF A < > 5465 THEN PRINT "ER
ROR!!! RECHECK YOUR DATA!!" : LI
ST 150 -
130 POKE 360,63 : POKE 361,199
140 CLS : PRINT : PRINT " THE ST
EPPER IS READY." : PRINT " TO AC
TIVATE, TYPE 'TRON'." : PRINT "
TO DEACTIVATE, TYPE 'TROFF'."
200 DATA 125,0,175,39,47,129,91
210 DATA 38,18,52,16,190,0,136
220 DATA 191,63,254,142,5,249
230 DATA 191,0,136,53,16,32,25
240 DATA 129,93,38,21,189,162
250 DATA 133,52,16,190,63,254
260 DATA 191,0,136,173,159,160
270 DATA 0,39,250,134,30,53,16
280 DATA 126,130,115

```

Program Listing. Stepper with delay (Break will stop Basic).

```

3FC7          00200      ORG    $3FC7
3FC7 7D      00AF       00210  START   TST    >$AF
3FCA 27      2F         00220      BEQ    RETURN
3FCC 81      5B         00230      CMPA   #$5B
3FCE 26      12         00240      BNE    NEXT
3FD0 34      10         00250      PSHS   X
3FD2 BE      0088       00260      LDX    >$88
3FD5 BF      3FFE        00270      STX    $3FFE
3FD8 8E      05F9        00280      LDX    #$5F9
3FDB BF      0088       00290      STX    >$88
3FDE 35      10         00300      PULS   X
3FE0 20      19         00310      BRA    RETURN
3FE2 81      5D         00320  NEXT   CMPA   #$5D
3FE4 26      15         00330      BNE    RETURN
3FE6 BD      A285       00340      JSR    $A285
3FE9 86      1E         00350      LDA    #$1E
3FEB 34      10         00360      PSHS   X
3FED BE      3FFE        00370      LDX    $3FFE
3FF0 BF      0088       00380      STX    >$88
3FF3 8E      F000        00390      LDX    #$F000
3FF6 BD      A7D3       00400  DELAY  JSR    $A7D3
3FF9 35      10         00410      PULS   X
3FFB 7E      8273       00420  RETURN JMP    $8273
                  3FC7    00430      END    START
00000 TOTAL ERRORS

```

```

DELAY    3FF6
NEXT     3FE2
RETURN   3FFB
START    3FC7

```

Program Listing. Basic Loader for Stepper with delay.

```

90 CLEAR 200, 16326
100 FOR X= 16327 TO 16381
110 READ Y : A= A + Y : POKE X,Y
: NEXT
120 IF A < > 5633 THEN CLS : PRINT "ERROR!!! RECHECK YOUR DATA !
!" : LIST 150 -
130 POKE 360,63 : POKE 361,199
140 CLS : PRINT : PRINT " THE STEPPER IS READY." : PRINT " TO ACTIVATE, TYPE 'TRON'." : PRINT "
TO DEACTIVATE, TYPE 'TROFF'."
200 DATA 125,0,175,39,47,129,91
210 DATA 38,18,52,16,190,0,136
220 DATA 191,63,254,142,5,249
230 DATA 191,0,136,53,16,32,25
240 DATA 129,93,38,21,189,162
250 DATA 133,134,30,52,16,190
260 DATA 63,254,191,0,136,142
270 DATA 240,0,189,167,211,53
280 DATA 16,126,130,115

```

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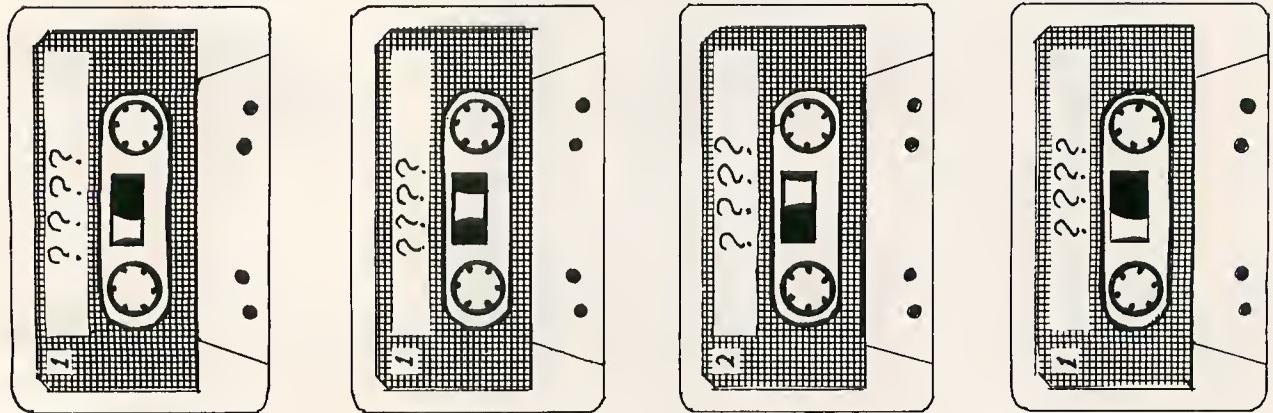
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TOM/FISH '83

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HOW MANY TIMES have you worked long into the night on a special program, and then returned days later only to discover that you can't remember where you saved it to last? Or, maybe you just found a tape and can't recall what was written on it. The CASSDIR program will solve these problems. If you have a printer it will provide a directory listing that you can store away with the tape. It also gives you more information than using the old standby SKIP "X".

To run CASSDIR, load the program, place a cassette in your recorder, rewind and set to play. Then type RUN. The program asks only one question: SCREEN (0) OR PRINTER (1). Enter 0 or 1, any other answer is wrong. Your directory listing will slowly appear on the screen or the printer.

CASSDIR gives you not only the name, but the file type. I use file type 4 to indicate files written by my editor, which may not be correct for you (since you are probably not using my editor). CASSDIR then tells you whether the file is ASCII (human readable) or binary (machine readable), and whether the file has gaps between each block. Most Basic files saved (those not saved using CSAVE "XXX".A) will have no gaps.

The final tidbit of information printed is the number of blocks of data in the file. Using only Basic with EXEC commands does not allow block counting in files that have no gaps. Files without gaps have this number set to -1. Figure 1 is an example of a directory.

To stop the program press any key and the program will stop at the end of the

by Byron Palmer

file it's on. If there are no more files on the tape you will have to push the Reset button to stop the program. This is like the SKIP "X" technique.

There are two interesting EXEC commands to call ROM routines. The first reads in a tape block and is located at \$A701 (42753). Data read by this call is stored starting at \$1DA (474) and is discovered using PEEKs. The second ROM call is to the SKIPF routine, to skip the rest of a continuous file. This routine starts at address \$A6D1 (42705). If a tape error

exists, the program does not stop. If the program finds a block of data which is not a file name block, when it expects one, or if there is some sort of error in the tape, then it lists the file as an Error and continues. SKIP "X" cannot function this way.

If, like me, you can never accept a program from someone else without improving it, here are some natural extensions that will provide a programming challenge. You could print the beginning, ending, and starting points for CLOADM type files. You could PEEK around in the ROM and learn enough to write an assembly language routine to get the number of blocks from a continuous file. But even if you don't accept the challenge, you will still find this program useful. ■ ■ ■

Figure 1. Program Output

FILE	TYPE	STRU	GAPS	#
PLANCOV	BASIC	BINARY	CONT	-1
LEAKYTAP	BASIC	BINARY	CONT	-1
HOUSEADV	BASIC	BINARY	CONT	-1
HOUSEADV	BASIC	ASCII	GAPS	12
KEEPTEXT	BASIC	BINARY	CONT	-1
KEEPTEXT	BASIC	ASCII	GAPS	22
INST1	DATA	ASCII	GAPS	17
INST2	DATA	ASCII	GAPS	18
ROWBOAT	BINAR	BINARY	CONT	-1
LSTMOD	BINAR	BINARY	CONT	-1
ERROR				

Program Listing. CASSDIR

```
60 REM LOAD TAPE, SELECT DEVICE
70 REM HIT ANY KEY TO STOP DIR
80 REM HIT RESET IF NECESSARY
90 REM #=NUMBER OF DATA BLOCKS
100 REM # IS NOT VALID FOR CONT
110 REM (NO GAP) FILES
120 REM -----
130 INPUT "SCREEN(0) OR PRINTER
(1)";DN:DN=-2*DN
140 PRINT#DN:PRINT#DN:PRINT#DN,
FILE      TYPE    STRU   GAPS #
150 PRINT #DN,"-----"
-----"
160 POKE 126,1:POKE 127,218' SET
UP READ BUFFER
170 EXEC 42753' READ IN BLOCK($A
701)
180 A=PEEK(124):IF A=255 THEN 38
0' CHECK EOF
190 IF A<>0 AND N=0 THEN PRINT#DN
,"ERROR"
200 IF A<>0 THEN N=N+1:GOTO 170
210 IF N<>0 THEN PRINT #DN,N
220 N=1
230 REM PRINT OUT FILENAME
240 FOR I=474 TO 481:PRINT #DN,C
HR$(PEEK(I));:NEXT I
250 FT=PEEK(482)' FILE TYPE
260 PRINT #DN," ";
270 IF FT=0 THEN PRINT #DN,"BASI
C";
280 IF FT=1 THEN PRINT #DN,"DATA
";
290 IF FT=2 THEN PRINT #DN,"BINA
R";
300 IF FT=3 THEN PRINT #DN,"ASSE
M";
310 IF FT=4 THEN PRINT #DN,"EDIT
";
320 IF FT>4 THEN PRINT #DN,"UNKW
N";
330 IF PEEK(483)<>0 THEN PRINT #
DN," ASCII ";ELSE PRINT #DN," BI
NARY";
340 GA=PEEK(484)' GAP FLAG
350 IF GA=255 THEN PRINT #DN," G
APS"; ELSE PRINT #DN," CONT";
360 IF GA<>255 THEN 420
370 GOTO 170
380 PRINT #DN,N:N=0' END OF FILE
390 IF INKEY$<>"" THEN PRINT #DN
:STOP
400 GOTO 170
410 REM SKIPF FOR CONT FILE
420 EXEC 42705:N=-1:GOTO 380 ■■■
```

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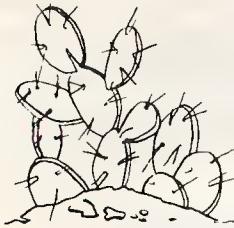
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Satellite Tracker



Satellite Tracker

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Outhouse

by J. Weaver, Jr.
distributed by Computer Shack
W H Enterprises
859 Winston
Monroe, MI 48161
\$29.95 disk, \$27.95 cassette



EVERY PROGRAM TELLS YOU it is original, unique, completely different, and so on. I found one that truly is.

Outhouse is as strange a concept as can be imagined. You hover above your outhouse trying to zap the thief and the squatter who are trying as hard as they can to steal your toilet paper from the outhouse. Not only do you have to watch out for the paper thieves, but there are some other nasties flying through the air that can take a toll on your ship and the outhouse.

The first thing I noticed about this game was the work put into the graphics: very clean and smooth movement on the part of the ships, flying nasties, and the two strolling paper stealers. The colors are good, with a black night sky for a background, and a very convincing outhouse with obligatory crescent moon on the door. Even the graphics used to portray the door opening and closing are good. This is one of the better examples of machine language programming and graphics I have seen. The author also did a fine job depicting the paper being strung out of the shack and ferreted away by the thief.

The introduction on the screen is clear and concise. It shows the kind of enemy objects to watch out for plus gives an introduction to the antics of the paper pinchers. A beginner to computers and games will have no trouble figuring this one out.

One of the intriguing things about the game is the way one shoots at the bad guys. (Actually, the game is so bizarre, it's hard to call them the bad guys.) The way it shoots depends on the direction you have your ship going. If you are

heading straight down and fire, the bolt will, accordingly, go straight down. If you are heading obliquely and fire, the shot will head in that direction. The joystick control is very smooth, making for an enjoyable game. I didn't use the keyboard control at all.

As I got better at the game, I noticed interesting things happening. After I got through three waves of the enemy, I had to be careful not to let some of the flying obstructions sit on top of the outhouse, for they have a lousy habit of crushing the thing. There are other flying weirdies that do damage to the shack also. Big, blocky things flatten the outhouse quite easily. However, if you knock them out, they are worth many points. You are also given three smart bombs that wipe out an entire screen of baddies. Use one if you are getting flustered. You get more when you go through each wave of attackers, and your ship supply is replenished (if you have lost any). At the beginning you are given three ships, three bombs, and 200 feet of toilet paper.

This game is quite a gem. The graphics are very good, the action is fast and clean, and the concept is delightfully silly. I recommend the game for anyone, regardless of age.

—Leslie Venable

Hyperzone

by Mike Lustig
Computerware
Box 668
Encinitas, CA 92024
\$26.95 cassette, \$29.95 disk



TO START, THE PERSPECTIVE used in "Hyperzone" is a great idea for the Color Computer. There you sit, looking out into the great void, while enemy ships come at you, firing bombs. You are looking out of the cockpit, and as you fire, your shots go forth like the head-

lights on your car. By using your joystick you can maneuver up and down and left and right to avoid bombs and to get the enemy ships in sight. The object is to get the enemy directly in front of you, but not too close. Fire away with the button and hope for the best.

Looking out into space is wonderful. The illusion of maneuvering is great fun. Watching the stars go by in proportion to your steering is also nifty.

However, though the game is innovative for the Color Computer, it needs some work. The motion of the space ships and bombs is jerky and slow, and steering is uncertain, slow, and not sweeping enough. Many times your ship is blasted by a bomb that can't be seen. As you go along, merrily plastering the enemy, all of a sudden the background and foreground colors change. This is very unnerving because the color combinations can make it hard to see clearly. The bombs are hard to distinguish, and the image becomes reversed and difficult to follow.

The game has a shield feature that protects your ship from bombs. The shields take up a lot of energy, so don't use them all the time. The only way to replenish your energy is to hit spinning energy pods. Unfortunately, the energy pods appear only at random intervals and it is hard to tell if you have hit them. Also, when the shields are up the screen shows a grid of shields right in front of your cockpit, making it difficult to see what is going on. Perhaps an indicator at the bottom of the screen would be easier to work with. I don't know if it was the keyboard of the Color Computer I was using, but many times I got no response when hitting random keys to turn the shields on and off.

"Hyperzone" has ten levels of play. The difference is in the number of ships you get and the number of the enemy engaged. It would be nice to have a speed setting that controls the speed of the enemy and the speed of your ship.

All in all, the game is a step in a fantastic direction, but it could use some work. The directions are quite adequate, so beginners will have no trouble figuring out how to play. The opening graphics are very nice, indeed. The only problem is that you have to sit through them each time a game ends. Perhaps a menu could be added to put you back into the game if desired.

With some refinements in the machine language *motion routines*, this game could rival some of the best perspective

REVIEW\$

space games ever produced. It's a good game for children and adults.

— Mary Chaucer

Computerware says that the screen color changes indicate time zone changes, and that the other bugs mentioned by our reviewer have been worked into the game on purpose to increase its overall difficulty.

Gin Champion

By Philidor Software
Licensed to Tandy Corporation
One Tandy Center
Fort Worth, TX 76102
\$29.95 RomPak



"**B**EWARE, ... YOU COULD FIND yourself shouting wildly at the computer!" That warning is on the first page of the instruction manual of "Gin Champion," and for good reason, as those of you who accept the challenge will discover.

There are five versions of gin and 10 skill levels. The game begins at level one with standard gin. You are given the opportunity to change levels and to choose which version you want to play before starting the game. Other versions of the game are "Oklahoma," "Runs Around the Corner," "Spades Double," and "Laying Off on Gin." You can play one or any combination.

A previous knowledge of gin is not required to enjoy "Gin Champion," for the manual is very thorough and the computer will not let rules be broken. For example, if you "knock" with too many points in your hand the computer immediately responds with an ILLEGAL KNOCK message. You then can review your hand (without penalty) before going on with the game.

The lower levels will challenge the novice just as the upper levels challenge

the more knowledgeable player. All levels are capable of winning, thereby causing you to "Shout Wildly!"; however, don't give up because the next hand may find you shouting "GOTCHA!!"

"Gin Champion" is a ROM cartridge and requires 16K but not Extended Basic. Try it, you'll like it.

— by Dale M. Harris

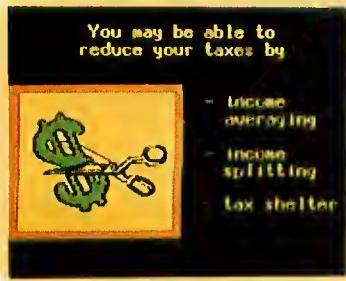
Celestial Basic

by Eric Burgess
Sybex
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One look through Eric Burgess' book *Celestial Basic* reveals how primitive our methods were. *Celestial Basic* is an excellent text for someone who has graduated beyond binoculars and toy store telescopes. The text mainly consists of Basic programs that determine and/or locate the exact time and position of stars and planets. Because most of the programs are strictly calculations, they should run on almost any microcomputer that has enough memory.

The book also contains a few graphic programs. The author mentions these programs were written on an Apple II (tm) computer using Applesoft (tm) Basic. One exception is a graphic program written in the Exidy Sorcerer (tm) computer's Basic format. The author believes these programs can be easily modified to run on other microcomputers. I did not type in any of the programs to try the conversion, so I have no estimate of the effort that would be required to convert for the Color Computer.

Celestial Basic is a specimen publication. Non-reflecting slick paper provides a suitable background for the clean, crisp text printed on it. Each program has a photograph of the celestial body for

which it is programmed, a clearly written text of the program, and a photo of the program data as it will be displayed on TV or monitor screens. These photos show the program data displayed on a 40 character by 24 line screen. Since the Color Computer has a 32 character by 16 line screen, some modifications will be necessary.

Near the end of the book are two pages of text I thought should have been at the front of the book. Here are found seventeen statements called an "Observer's Guide to the Programs." These statements are masterpieces of brevity; they clearly tell the name of the program, what it does and why one would want to use it.

It seemed to me that there was one serious omission. The author should have listed the Basic statements used in his programs, so those of us with more modern computers could determine at the onset what changes will have to be made in the listings before we have typed in half the program.

The author states that results obtained by the computations are sufficiently accurate for most practical purposes. A bibliography is included for those needing

more precise computations. *Celestial Basic* would be an excellent addition to the library of any astronomer who uses a computer or any computerist who uses a telescope.

—by Russel M. Hokanson

Wizard 64

by Chris Hawks
Skyline Marketing Corp.
4510 W. Irving Park Rd.
Chicago, IL 60641
\$21.95 cassette, \$23.95 disk



If you like Lord of the Rings-type imagery, working out mazes, and

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TRS-80 Color Computer Program Writing Workbook, by Ron Clark, 96 pages, 8 1/2x11, ISBN 0-86668-816-1. **\$4.95**

REVIEW\$

searching for treasure, the Wizard's Tomb series is for you. But if you'd rather wield your own sword than watch a computer fight for you, you'll have to look elsewhere.

"Wizard 64" comes on cassette and disk and combines the previously released "Wizard's Tomb" parts one and two, each available only on cassette. While it does require Extended Basic, the game does not require a 64K machine as advertised—Skyline just has its own way of defining things. Part one leaves players deep in some catacombs that are themselves far above the buried treasure. Part two can be used either to pick up from there, or as a game in itself. The "64K" version offers the whole game at a substantial savings over the two part's combined cost. The tomb series can be played by one, two, three, or four players.

The game pits players against invisible greels, warogs, mummies, and the like, all loyal to the wizard. When the time for defensive action arrives, you simply enter either a Fight command or a command to cast a spell over your attacker, sit back, and watch some colorful, but so-so, graphics. Fights are short dances to the death between a pair of stiff, jumpy antagonists. The sword held by the figure representing you never moves, even when you win. Spells are Etch-A-Sketch kinds of graphics that grow on the screen to the accompaniment of sound effects. After either of these commands are executed the computer tells you to try one of them again, congratulates you on a victory, or tells you that you've lost. Skill as a joystick operator is the last thing you need. A little influence with the random number generator would be much handier.

Speaking of influence, you may have to buy your way into the tomb, so a small bag of gold is listed as one of the six "weapons" available at the inn, where play begins. Players may choose only three weapons. Besides the gold, weapons include food and water for a week, a chain of mace, a spell to repel attackers, a charm of protection, and a suit of armor complete with sword and shield. At the inn you're assigned a certain number of points; "life points" are used up during the game's general course, "ability" points are used during fights and spell-casting.

While there is little call for eye/hand coordination in this game, there is room for a different kind of cerebral exercise. There is a map display showing the inn, a lake, a forest, and a distant mountain

range that is the wizard's home, but you must plot your own course (with or without the help of a pencil and piece of paper) to keep track of your progress. Players move north, east, south, and west in one-step increments through the terrain and through the tomb itself. Keeping track of where you've been is always a good idea. It becomes more important in the tomb, as laced as it is with rooms, passageways, catacombs, and dangers.

The fun in "Wizard's Tomb" lies in unraveling the tomb's layout, avoiding the dangers within, battling the Middle Earth baddies, and, of course, reaching the payoff. It's a fine rainy afternoon's diversion for a group of kids, and for kids and their parents. It conjures up plenty of other-worldly spookiness and offers a good exercise in geographic orientation, but it is not an action game in the strict sense. Not-so-young players may be left with the odd feeling of having watched someone (or something) else fight their battles.

—T.J., Color Staff

Pooyan

DataSoft Inc.
9421 Winnetka Ave.
Chatsworth, CA 91311
(213)701-5161
\$29.95 cassette and disk



IF YOU ARE a Color Computer arcade game fan and don't have a 32K computer, get an upgrade quickly. Once again DataSoft has introduced an arcade game for Color Computer users that needs 32K. The new game, "Pooyan," is plenty of fun and packs a lot of excitement.

Pooyan is a battle between pigs and wolves, and a mighty battle it is. While the nasty wolves float down from a treetop and throw deadly acorns at the pigs, the pigs defend themselves by shooting arrows at the wolves.

The pigs are somewhat defenseless

while being lowered from their cliff in a basket. The wolves use helium balloons to gently float down while throwing their acorns, so what can the poor pigs do? Use their one secret weapon—a chunk of meat. If a pig throws meat to the wolves, the wolves let go of their balloons and die. However, if too many wolves reach their lair, they can climb a ladder and attack from behind.

That is the challenge of the first scene: shoot 32 wolves in five rounds and you move to scene two. This is easier said than done and, per usual, the game gets tougher as you get better.

In scene two, balloons and wolves float from the bottom to the top of the screen, and some balloons have one or two additional balloons inside. You only make points when you hit the innermost balloon and the wolf falls to the ground.

In the second scene, when there are five or fewer wolves remaining, the Boss Wolf appears with a fancy, multicolored balloon. Don't be impressed by high-res graphics—hit him with the meat or with a barrage of arrows.

Don't let seven wolves get to the top in scene two, either. If you do, prepare for the ultimate disaster: a giant rock will be pushed down on you.

Plenty of information is available on the screen. The number of wolves remaining is displayed at the top left, your remaining turns appear at top right. For entertainment, pigs that have been kidnapped are shown in jail at the lower left corner.

"Pooyan" is bound to be a big hit with Color Computer enthusiasts. It can be played with joysticks or the keyboard, it's a one or two player game, and a demonstration mode is included.

—by Paul Kimmelman

Dragon Cruncher

Elkan Electronics
1369 McCarter Highway
Newark, NJ 07104

CRUNCHER IS A MACHINE language program which can be loaded into either a Color Computer or a Dragon. It converts Basic programs for one into a program for the other.

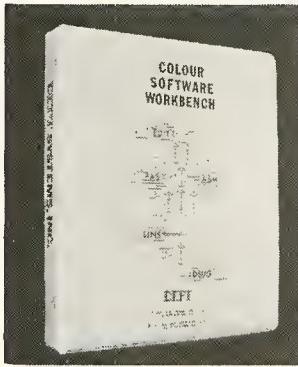
Since I had just finished a review of the Dragon, I was anxious to review this first software arrival from the U.K. At first I thought the program would convert all Color Computer programs to run on the Dragon, but found it would only work on

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The Colour Software Workbench (CSW) is a system of machine language programs that run on a 32K or 64K TRS-80 Color Computer Extended Disk Basic System. It lets you develop machine language programs in a combination of Pascal and 6809 Assembler source languages. The 240+ page CSW User's Guide that is included explains the fundamentals of the languages as well as how to use the package.

Part ONE of the CSW User's Guide tells you how to use all of the programs in the Workbench. This first part contains one section for each program.



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- Explanation of Source Listing Format

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 - Object and Listing to Tape, Disk, Screen or Printer
- Explanation of Source Listing Format

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Part TWO of the CSW User's Guide provides you with the background information needed to write programs using the Colour Software Workbench.

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- Complete Pascal and Assembler Language Source
- Uses All Parts Of the Workbench
- Resulting Program is a Text Processor

PASCAL

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 - Files
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- Arithmetic, Boolean, and Set Expressions
- Statements: IF, WHILE, REPEAT, CASE, GOTO, EXIT, FOR, BEGIN, assignment (:=)
- Input/Output: RESET, REWRITE, READLN, EOF, WRITE, Writeln, CLOSE, PAGE
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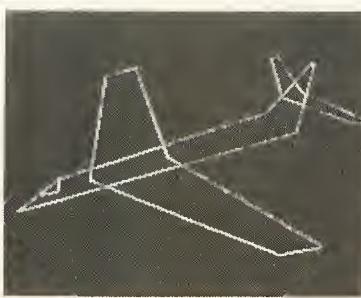
- Strings Support: Assignment, Comparing, Concatenation
- String Procedures and Functions: STRINGCOPY, STRINGDELETE, STRINGINSERT, STRINGPOS, HEX, ENCODE, DECODE
- Type Extensions for Structured Type Breaking
- Absolute Memory Access via Built-in WORD and BYTE Arrays
- ROM Routine Access via CALL Built-in Function
- Static and Public Variable Allocation
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- Listing and Multiple Source File Directives
- Explanation of Error Messages

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- CoCo ROM Compatibility
- Pascal Runtime Library Assembler Interface
- CSW Object File Format



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PRESENTS



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REVIEW\$

those written in Basic. This had not been a problem for me since, if I wanted to run a Color Computer program on the Dragon, I would save it to tape in ASCII and then CLOAD directly into the Dragon. This procedure would, of course, be impossible if the user did not have both computers available. This, then, is the reason for the existence of "Cruncher."

The program performs as advertised: CLOADM into either machine, then CLOAD the target Basic program. After the Basic program is loaded, type EXEC. You are given a choice of converting from TRS-80 to Dragon or vice-versa.

The program is simple, and it works. It would be helpful if you own one or the other computer, but not if you own both.

—Larry Cadman

The game is slow, but don't let that get in the way of having a good time. The game is a good time!

—C. DeSimone

The Complete Handbook of Personal Computer Communications

by Alfred Glossbrenner
St. Martin's Press
175 Fifth Avenue
New York, NY 10010
\$14.95

Ms. Nibbler

by Thomas Czarnecki
Color Quest
9072 Lyndale Ave. So.,
Minneapolis, MN 55420
(612)881-2777
\$19.95 cassette, \$24.95 disk

MS. NIBBLER IS A POPULAR arcade simulation program that has enough sound and graphics to keep you playing for hours.

The scenario is a maze-like screen at the bottom of the ocean. The oyster at the top of the screen is you; in the box at mid-screen are three sandmonsters. You use the right joystick to guide your oyster through the maze while changing sandbits (red pixels) into pearls (blue pixels), trying all the while to avoid the sandmonsters. To get revenge on the sandmonsters you can eat one of the green catalysts found in the corners of the screen. This will turn your character red; then you can eat steadily. Don't eat for too long, though; after you hear a clicking sound you will have just a little bit more time to eat the sandmonsters — then trouble arrives.

Eating a green starfish, which will appear occasionally, scores points. Scoring is quite simple. You get 15 points each time you make a pearl, 30 points for eating a catalyst, 500 points for eating a starfish. For eating the first monster you get 100 points, the second scores 200, the third 400, etc. The game also stores the 10 top high scores to compare yours against.

THIS BOOK'S TITLE indicates that it is a "complete handbook" and the subtitle states that the book tells you "everything you need to know to go online with the world." Although these statements might appear to be hard to live up to, Mr. Glossbrenner's book comes very close to completely meeting the description.

The presentation can be divided into three primary areas: general information (the basics of communications); specific information (the many alternatives available); and appendices (useful information in concise form). In general, the book is written for the novice, assuming no previous knowledge or experience with computer communications. This approach is carried throughout, with very few lapses, and when specific terminology is used Mr. Glossbrenner includes appropriate definitions and examples. It is a technical book written for the non-technical person.

In the general information category, the author presents numerous definitions and concepts. For example, he differentiates between information utilities, encyclopedic databases and bulletin board systems, with appropriate definitions of each. He addresses the topic of telecommunication basics with a discussion of how databases are accessed, hardware and software concepts, including a section on troubleshooting.

The heart of the book, though, is the section on specific databases. Most of the chapters are dedicated to these discussions, and it is here that the book is most valuable. Mr. Glossbrenner gives on-line tips throughout and discusses the peculiarities of each database as only

someone intimately familiar with each could. All of the most popular databases (The Source, CompuServe, The Dow Jones News/Retrieval Service and BBS's) are discussed (most have entire chapters dedicated exclusively to them). Additionally, much detailed information is presented on some of the lesser known databases such as DIALOG, BRS, ORBIT, The Information Bank, NewsNet, and others. After reading these chapters, one gets the impression that the next several months could be spent doing nothing but exploring the possibilities of all of these databases!

Some of the chapters are devoted to particular topics such as electronic commerce, conferencing via computer and telecommuting (linking up with other mainframes). Again, these chapters are well presented, contain a wealth of detail, and are accurate.

One of the strong points of the book is Mr. Glossbrenner's ability to present methods, tricks and time-saving tips rarely seen elsewhere, including documentation from the databases themselves. Regarding CompuServe, for example, he suggests which documentation to purchase and which is better obtained on-line. He also enumerates some commands not documented anywhere on CompuServe but which are essential to moving about in the system with any facility.

The appendices are full of useful summaries such as tips on how to access typesetting, electronic mail, complete directories and quick references for the major information utilities (CompuServe and The Source). The tables and references in this section are very useful.

The book is full of sample on-line sessions and these help the reader develop a feel for what to expect while participating in computer communications. These sample sessions help the reader develop confidence before using the trial and error method, which often leads to frustration.

The book contains phone numbers of bulletin boards and other information access facilities. As time passes, this could be a negative point. As long as the book is current, that information is extremely useful; however, frequent revision will be the only way to keep this information updated.

That is true for the entire content of the book. The state of data communications is constantly changing; if Mr. Glossbrenner can continue to update the book for subsequent editions, it will continue to be a valuable reference.

This book is an excellent buy. At \$14.95 for 325 pages of valuable information, it is a must for anyone who seriously wants to enter the world of data communications. It handles a rather intimidating subject in a non-intimidating way. I highly recommend it.

—by Norman Garrett

A Mozart Composer

by A. Lee Messer, III
Circle Soft
3325 Woodbine Lane
Charlotte, NC 28210

\$14.95 cassette

WOFGANG AMADEUS MOZART (the inspiration for the Broadway play Amadeus) is credited with the composition of *Musikalisch Wurfspiel*, although there is some question as to its authenticity. This quaint composition consists of two tables of measure numbers used with the toss of two dice, and a set of 176 numbered three-beat measures. The rows of each table correspond to the possible results of the toss of two dice (and are labeled 2 through 12), while the columns are numbered with the Roman numerals I through VIII. There are 11 rows and eight columns per table, for a total of 88 measures per table, and 176 measures in all. The first table is used to generate the first eight measures of a minuet (complete with first and second endings) and the second table is used to generate the second eight-measure period of a minuet. To quote Carousel Publishing Corporation's edition of the *Musikalisch Wurfspiel*, "The idea of such a game did not originate with Mozart, but his probably produces the most artistic results."

To use the *Musikalisch Wurfspiel* in its original form is both time-consuming and awkward. You have to roll the dice for each measure, then find the number of the measure in the table of measure numbers, find the notes of the measure in the table of measures, and copy the notes of the measure onto blank manuscript paper. Finally, when you have done this 16 times, you are able to play the composition; you play the first eight measures with the first ending, repeat the first eight measures with the second ending, and finally play the second eight measures. This sequence (first

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eight twice with two endings, second eight measures) is then repeated once. Skill at sight reading helps.

There has to be a better way — and the Color Computer, with its excellent music playing ability, seems like the ideal device for removing the drudgery from the *Musikalisch Wurfspiel*, since it cannot only pick the measures at random, but it can also play the composition for you.

There are three possible choices that could be used to play the composition: play only the melody line, using the Sound or Play commands in Basic; alternate rapidly between notes of the chords, using either the Sound or Play commands; or use machine language subroutines to play the notes of the chords simultaneously (such as is used in "The Composer," reviewed in the August issue of **The Color Computer Magazine**). The single-note approach is not very authentic, as sometimes the moving part is in the bass clef. The alternating note approach sounds like an underwater yodel, and does not approach the illusion of simultaneous note playing. Only the machine language approach

could produce something which sounds similar to what a musician would play.

"A Mozart Composer" uses the second of these approaches to bring the *Musikalisch Wurfspiel* to the Color Computer, however. The instructions describe the results by saying "This gives the music an arcade-like 'outer space' sound." Many listeners find it difficult to listen to it for any great length of time. My wife described it by saying, "It sounds as if they are going *phtt*." Even so, some of the charm of the underlying music comes through. If you want to find out if you like music played in this way, run the following short program:

```
10 FOR T=1 TO 20:PLAY" L25501A02A03A04A05  
A":NEXT
```

The idea of adapting *Musikalisch Wurfspiel* to the Color Computer is an attractive idea, but I would be happier if a true simultaneous playing of the notes of a chord had been used. Knowing how the music sounds, the user must decide for himself if he will enjoy it.

— by David R. Barr

TRS-80 Color Computer Assembly Language Programming

by William Barden Jr.
Radio Shack
One Tandy Center
Fort Worth, TX 76102
Radio Shack #62-2077
\$6.95

HERE ARE SEVERAL excellent books available on assembly language programming for the 6809. There are also several good assembler programs available for use with the Color Computer. Until now, linking the study of one with the use of the other has been left to the programmer, a major obstacle for beginners. After much anticipation and many delays, Radio Shack has finally published their book on assembly language programming for the Color Computer, using EDTASM+. The book, written by programming guru William Barden Jr., is

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an excellent tutorial for the beginning assembly language programmer.

The first chapters start with explanations of some of the EDTASM+ commands and how they function in developing a program. Also included in this section are additional comments on some assembly language mnemonics, as well as "Hints and Kinks" on relating the two.

The book covers hexadecimal and binary number systems (do I hear groans??) in a painless and interesting way. As the aspiring programmer progresses through the book, he is introduced to the 6809 registers, condition codes, branching, indexing and other programming concepts—all this while learning to use an assembler with the complete 6809 instruction set, and always in the laid-back, easy-flowing William Barden style.

If you have had your Color Computer for awhile and you are thoroughly confused by your more experienced friends when they are talking about "stack pointers," "&HCOOO," or "pseudo ops," this book is a must. At \$6.95, it is also an excellent educational buy.

—Larry Cadman

Glaxxons

Mark Data Products
24001 Alicia Pkwy, #226
Mission Viejo, CA 92691
(714)768-1551
\$24.95 cassette, \$27.95 disk



WITH A STENTORIOUS Jaws-inspired soundtrack thrumming in the background, your ship rises up from the bottom of the screen to do battle with the ne'er-do-wells. As they come winging down from the top of the screen to form tightly knit rows of missile flinging villainy, you grip your joystick tightly and fire on the now-descending spacecraft. Then another ship swoops out of

formation to dive at you. You veer your ship and keep firing (don't fire too fast or you'll negate your previous shot).

In "Glaxxons," you have four types of enemy ships to clobber plus their missiles. You choose the game speed and playing difficulty. At a speed of seven, the fastest possible, the dum-dum-dum-dum of the soundtrack is reduced to a high-pitched nervous giggle (something like the Supremes singing the *Jaws* theme at 78 RPM). I don't know if the comic relief is intentional, but I got a chuckle out of it.

As you fire away at the ships in formation and the ships peeling off and diving at you, avoid their missiles and the enemy attempts to ram you. You are allowed three hits on your ship before it is destroyed. You are given three ships in a game.

I found my best offense was, in many cases, a good defense. I would hit as many of their ships as possible while they were in tight formation, and then fire as they swooped down to the kill. Most of the time I spent running. By doing this I stayed alive a lot longer than by being a belligerent Space Patton. It isn't too hard



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avoiding enemy craft, but their missiles are a bit tricky. The only way to knock them out is to hit them dead on.

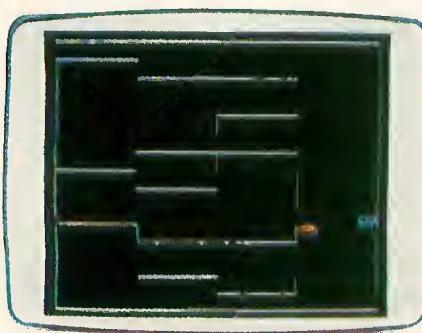
The graphics in the game are acceptable but not spectacular. Sound effects are included but, again, nothing out of the ordinary — your basic muffled phaser blast and disintegration whump. The game provides a running account of your shield power and the highest score for the day is posted on the screen. Instructions on the box are fine and cover everything you need to know.

I played for quite some time trying to find the least frustrating levels of speed and skill, and trying to get the best of the missiles. My best score was a shade over 10,000. You really have to learn to use your joystick, a skill which makes "Glaxxons" a good game for older children and adults.

—Charles Holland

Bumpers

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BUMPERS IS AN interesting maze game featuring invisible walls. As you start the game, either from the top left or bottom right of the screen, and try to make your way to the diagonal corner before your opponent makes it to your corner, you bump into walls. You don't get to see them, however, until you've collided. Once they are visible, they stay visible until the end of the game.

I played the computer each time. My representative was a smiling green face. The computer was dealt a red death's head image. The game is played with joysticks, and you maneuver through the maze until you run into a wall.

Mark Data has incorporated some features that make the game surprising. At the beginning of each game, the ran-

domly generated maze hides three booby-trapped walls. If you or your opponent hit these walls, you are sent back to the beginning. There is another feature that lets you booby-trap a wall using your joystick. Make sure you remember which walls you have rigged; you are allowed three traps.

One other item makes the game especially fun. If you and your opponent cross paths, hit your joystick firing button and you'll send your opponent winging off to some other location in the maze. This is a good ploy if you happen to be near your base and your opponent is coming on strong.

"Bumpers" starts off with a menu-driven introduction that asks for the number of opponents, the dimensions of the maze, set from 1 by 1 blocks to 13 by 15. Then it asks for a skill level from one to four, four being the hardest. This determines how hard the computer will play against you.

Setting the maze at 1,1 creates a wide open space so your only hope is to outrun or zap your opponent. I found the full 13 by 15 maze to be the most fun, and a skill level of two or three to be the least frustrating.

The graphics animation is good, fairly fast and doesn't suffer from refresh blinking or wriggling. The joystick handles very nicely, making maneuverability quite easy.

Using strategy, the game can be enjoyed by adults but children would probably get the most enjoyment from the mazes.

—R.C. Ain

Fury

by Tim Purves
Computer Shack
1691 Eason
Pontiac, MI 48054
16K/32K
\$27.95 cassette, \$29.95 disk

FURY IS ANOTHER arcade simulation, but this one is different: this game talks! You don't need any special equipment for sound; just turn up the volume on your TV or monitor. Fury has enough good graphics and sound to move it ahead of the rest. It's one of the best games I've ever seen.

The playing field is in the air. You battle countless numbers of enemy airplanes, helicopters, hot air balloons, parachutes, and, after you reach 5000

points, a magnetic air mine. You earn 100 points for shooting an airplane, 100 for helicopters, 2000 for hot air balloons, and 1000 for ramming a parachutist. It's not possible to destroy the mine. A bonus ship is earned after you successfully shoot down 20 enemy airplanes or helicopters.

One of the best features in this game, and one I believe no one else has for the Color Computer, is the sound. Don't turn your volume up too high or it will sound fuzzy and you won't be able to understand the speech. The game says things like "P..." — no, I won't spoil it for you, you should hear it for yourself. The speech is not the only great feature of this game — it also has outstanding graphics.

I think Tim Purves (the author of this game) and Computer Shack did a great job, and I hope to see more of their work in the future!

—by C. DeSimone

Buzzard Bait

Tom Mix Software
3424 College N.E.
Grand Rapids, MI 49505
\$27.95 cassette
\$30.95 disk



TOM MIX SOFTWARE'S latest release is one of the biggest feathers in its cap. It has shoe-horned a complete "joust" program into a 32K machine, including sound effects like birds walking and a hand groping in a lava pit.

Buzzard Bait is a game of avian skill. It pits you against computer controlled mounts, a flock of nearly invincible buzzards, and (optionally) one other player. You control your mount by joystick. The object is to dismount your opponents by jousting them when they are at a disadvantage (below you), which turns them into eggs. Eggs hatch into unmounted riders in time, if they haven't fallen into lava. You must run into these eggs to stop this from happening.

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I put jargon in its place, too. If you've ever been intimidated by genius programmers, you'll know what I mean. You'll be able to drop a few accumulators, registers, and zero-indexed offsets into your conversation, too.

So contact me or RB2-3 at Green Mountain Micro. "Micro Language Lab" comes in a notebook containing twelve cassettes, documentation, workbook, and data booklets. It costs \$99, plus \$2.50 shipping and handling. Z80 and 6502 Labs will be available shortly.

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move. Your bird will walk, run, and even skid to a stop when you change direction. Repeatedly press the button to flap its wings. The wings must keep flapping or your buzzard will fall to the ground, so keeping it flying must become almost second nature before you can make any kind of decent score.

Animation never looked so real. There is no flicker or jerkiness. The birds respond quickly. Sound effects are synchronized with the action, not overdone, and you can tell what is going on by ear. With the proportional joysticks of the Color Computer, the birds are even easier to control than at an arcade — you don't have to bump the underside of things a lot because moving fast horizontally doesn't mean climbing fast, if you don't want to.

As your score gets higher and you make it to more screens, things get tougher. Lava rises up to the ground and burns part of it away. Buzzards show up, first as loners, then as flocks. One must be a master rider to win a joust with a buzzard. Elevated platforms dissolve, turning things into a free-for-all dogfight. I'm not sure what else is thrown at you because my three mounts never got past the sixth flock of opponents.

I found myself concentrating on my flying technique, not cursing the game or computer. It has been a long time since I have played a game good enough to really give me some fun. Tom Mix has hatched a winner.

—J.T., Color Staff

DWP 210 Daisy Wheel Printer

Radio Shack
One Tandy Center
Forth Worth, TX 76102
(817)390-3885
\$799

NOW THAT I HAVE good word processing software and all my correspondence neatly formatted, what can I do about the quality of my printing? About dot matrix fuzzies? Well, one thing is to connect my Color Computer to RadioShack's letter quality printer, the Daisy Wheel 210.

This printer is software compatible with the DWP 410 printer, and has both

parallel and serial interfaces. It prints in three character pitches (10, 12, and proportional spacing) with up to 115 characters per line at 10 characters per inch. There is also a fairly inexpensive tractor (pin) feed attachment available. And the whole thing is built at least as well as Radio Shack's respected Daisy Wheel II printer.

The 210 automatically underlines selected text with simple one character commands. It also advances or reverses paper by one line feed or by half a line. Paper can be advanced by $\frac{1}{48}$ th of an inch, and the print head can be positioned to $\frac{1}{120}$ th of an inch, too. Superscripts and subscripts are available, as well as automatic bold face, and the plotting of detailed graphs (with extra programming).

The 210 has some intelligent features as well. An internal 180-character buffer makes bi-directional printing possible, which can increase printing speed (an admittedly slow rate of 18 characters per second) by up to 50 percent, depending on text. Radio Shack provides for special character font expansion with an "external program mode." In this mode the host computer tells the printer how wide each character is to be spaced, and how hard to strike it for uniform character density.

The default switch settings are easily changed, since they are conveniently located at the top rear of the case. These switches select the serial or parallel interface, 600 or 1200 baud serial interface speed, paper-empty switch recognition, print hammer intensity, self-test operation, and auto logic seeking mode. The labels for these switches are on the underside of the small lid, so you don't have to chase the instructions down when they need altering. And the printer is easy to connect to the Color Computer via the serial DI cable; I had it running listings 10 minutes after it was out of the carton.

It is a joy changing the print wheel — just pull a lever up and remove the old wheel, drop in the new wheel and push the lever back. The ribbon and platen easily pop in or out as needed, too. However, getting the font of your choice is a matter of luck and waiting. Printing speed is too slow for heavy output jobs, too.

The clear plastic lid has a character graduation scale that is not close enough to the paper to be of any real benefit. However, the lid is double hinged — a small lid in a big one — so that single sheet feed by hand is made easier.

When I tried to use a parallel to serial converter from my Color Computer to the DWP 210, all I could get was garbage. It seems that Radio Shack has altered their parallel interface specifications from that used in the Daisy Wheel II and others, and the converter would need rewiring to be compatible. It really doesn't matter much though — 1200 baud serial operation is more than enough to keep up with 18 CPS.

Altogether, I am quite pleased with my new printer. I get professional results without hassle, and I can still pursue my hobby, hacking graphic plotting programs into shape.

—J.T., Color Staff

Time Patrol

Computerware
Box 668
Encinitas, CA 92024
(619)436-3512
\$26.95 cassette, \$29.95 disk



ACCORDING TO THE SHEET in the package, the year is 2283 and your spaceship has just meandered through a time warp while flying a recon mission over Moscow after World War IV. Instead of encountering F-47s, you run into Sopwith Camels. If you can work through that group, you get to fight UFOs and helicopters.

What you find when the game starts — after some snazzy graphics — is a ship rooted in the center of the screen, spinning and firing at randomly approaching enemy ships and parachutists. Actually, you can't shoot the parachutists, just ram them. So much for fair play.

The game is controlled by the right joystick and firing button. You are allowed unlimited firing power so you can keep your finger on the trigger as the enemy approaches. I found that a mild sweep with the trigger down cleared the baddies most effectively.

So you don't get upset about jumping

PETROCCI FREELANCE ASSOCIATES

Inspector CLUEseau

Sherlock Holmes/Agatha Christie fans—it's finally here—A murder mystery game for the 80-Cl Mr. Goodbody has been killed in his mansion and you must solve the mystery. WHO committed the murder, WHERE did it occur and HOW was it done! Question suspects, find the secret passage, and break the code to get clues. Hi-Res graphics enhances this excellent game. The computer records the clues you obtain on a clue inventory screen and also provides suspect descriptions at the touch of a finger. A fast, fun game that will sharpen your deductive skills. Every game is different!

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into the fray cold, a practice mode is included. Play it for a spell; you'll need to get used to the joystick control. You'll also have to get used to the way action slows down if you hold the firing button down.

I found that the ship really didn't want to point in certain directions easily. Whether this was due to my joysticks or the routine in the program controlling joystick movement, I don't know. It wasn't a real problem, and over all, the program behaves quite well. Movement is acceptable, graphics are average and the only drawback is the display for the enemy ships' bombs. They look too much like stars: quite often I didn't even bother with them and succumbed to their power as a result.

As you get through the enemy, you are rewarded with a chance to shoot a big enemy ship. Hit it twice and you get an extra ship, plus a boost to the next level of play.

The instructions are good, with all you need clearly described. Time Patrol is a good game, especially for children.

— Charley Marshall

Words About Things Words That Act

Radio Shack
One Tandy Center
Fort Worth, TX 76102
4K
\$8.95 cassette, each

TWO SOFTWARE PROGRAMS offered by Radio Shack were developed to meet the needs of children in the rapidly expanding area of home instruction. Reinforcing skills taught in the classroom is an important factor in the total educational process. These vocabulary tutors help develop and reinforce the child's vocabulary.

"Words About Things" and "Words That Act" use a talk/tutor format. This format uses the recorded voice. After the programs are loaded they function by user response; the play button on the cassette recorder remains depressed, and the program starts and stops automatically.

As each new vocabulary word is introduced to the user, the word and a picture

of it are displayed. The narrator then uses the word in context and asks a question. Questions use multiple choice or fill-in-the-blank formats. The student must answer multiple choice questions by depressing number keys 1, 2, or 3; the fill-in questions require typing the correct answer. A correct response must be entered before the program continues.

Talk/tutor programs are an excellent format for instructional software. They provide auditory learners with the reinforcement they need to learn more effectively. Talk/tutor format employs the recorded voice; the advantage over voice synthesis is in speech clarity. Many synthesizers cannot produce the clarity of voice necessary for top quality computer-generated speech.

The documentation supplied with the programs is clear and concise. However, younger children may require the assistance of an adult when initially using them.

I believe these programs are adequate for home instruction. Some of the graphics could have been of a higher quality, but for the minimal cost, I feel these programs will be beneficial.

— by David Macall

HJL Keyboard

HJL Products Inc.
955 Buffalo Road
P.O. Box 24954
Rochester, NY 14624
(716)235-8358
\$79.95



THINGS ARE DIFFICULT enough when I am working against deadlines, but when my original Color Computer keyboard required WD-40 and TV tuner cleaner to stay functional, I decided to act. I ordered a brand new replacement keyboard from HJL Products, which claims their product was designed specifically for the Color Computer.

It is well-designed. Built on a sturdy aluminum plate with stiffening folds, the keyboard comes with complete, simple, well-written installation instructions, and has a better feel than any other Color Computer keyboard I have tried — similar to the Model III/4 keyboard, but with a slightly heavier action.

The ergonomic (efficiency-minded) keytops, with anti-glare surfaces and highly readable characters, are welcome. The keytops have a color layout almost identical to the original keyboard (the shift keys are gray instead of white), and are just where this long-time Color Computer user has learned to expect them.

Installing the keyboard took only 15 minutes. The hardest part was the removal of the top of an unused support post. For that I used a pair of diagonal cutters. There is a new bezel for the case, and clips to hold it and the keyboard in place.

Two problems with the instructions arise due to the many internally different versions of the Color Computer that Radio Shack has created. My 32K revision E board had a sheet plastic and foil extension of the ground plane under the keyboard that the instructions don't mention. It was in the way and had to be removed with scissors. The new keyboard is properly shielded, which makes the foil unnecessary, anyway. The instructions remind you that there are two kinds of keyboard connectors, and that all TDP-100s have the newer kind. However, I have seen an older TDP-100 with the older type. Fortunately, few owners will be confused by these oversights.

Keyboard feedback is moderate to light, and response is quick. It feels lighter than it is because keystrokes are recognized after only a third of the full key travel. This required some retraining of my touch typing, as I had gotten used to the heavy clicking of the stock keys. I have been told I am a fast typist, but when a friend sat at my newly modified system he made me look like a keyboard klutz. This keyboard lives up to its claim of speed.

Four new function keys are a mixed bag. How could I use them without new keyboard software to define them as function keys? The routines in Color Basic ROM don't expect keys to be present in the matrix where these function keys have been added. Clearly some keyboard driver extension is needed, and HJL now includes one free with each unit. The routine is in Basic and takes about 20 minutes to enter. This driver

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The series, "BEING BOSS", offers to the user the latest in management skill development concepts and should prove to be an invaluable TDL for anyone who wishes to reach their full potential as a leader. The author has condensed week long intensive workshop material into this outstanding package. The accompanying user's manual is very well written and is easily understood by anyone.

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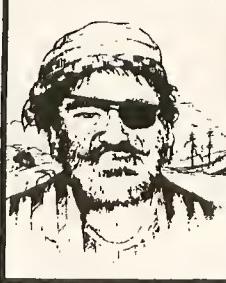
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turns the F1 key into a text screen print key; F2 becomes a repeat key; F3 duplicates the Shift 0 case toggle function; and F4 becomes a control key. The screen print function key works when you hold it down and press Enter, and since both of those strokes are passed to Basic, a ?SN ERROR message pops up at the end of the print.

All in all, the keyboard is a sturdy and reliable unit. Contacts are the new full-travel membrane type, spillproof and rated for 100 million cycles. With a 15-day money back guarantee and full one year warranty, this keyboard is well worth the price.

—J.T., Color Staff

Math Invasion

Crystal Software
6591 Dawsey Road
Rock Creek, OH 44084
\$19.95, cassette only

YOU DON'T HAVE to be a large company to produce a successful program. Crystal Software already has Time Teacher, a fine time-telling program, on the market. Now comes Math Invasion, a fun math game. Despite the arguments against this "fun" type of educational programming, I found myself intrigued and playing for quite a while. Perhaps it is the old Atari Space Invaders love coming out in me. I also tested the program on an eleven-year-old who shows no particular interest in computers and found that the program was again used for a long time.

Math Invasion is a take-off of Atari's Space Invaders. Four aliens containing math problems descend to your planet. Your mission is to solve the problems and destroy the aliens. This is vicarious violence, but isn't that what makes space games so popular? I share the concerns of many who do not like violent games, but Math Invasion doesn't carry the concept of destruction too far — nor is destruction its main theme.

There are two menu options for the program. The first lets you select addition, subtraction, division, or multiplication. The second asks if you are a beginning, intermediate, or advanced mathematician. Be careful, advanced problems

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are hard to compute in your head while those aliens are descending.

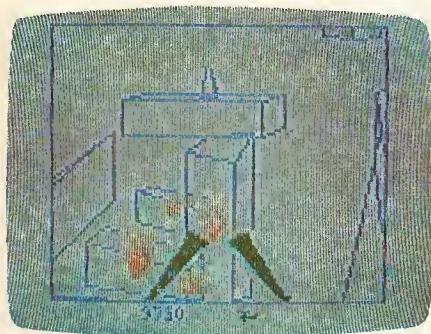
Addition and subtraction skill levels can call for either one digit or double digits. Multiplication can range from 0 to 9 for the first number and 7 to 9 for the second number. Division has the same range as multiplication.

A fine feature of this program is the "computer aided defense system" (CADS), which provides a correct answer to one of the descending problems. The program also includes an auto-display mode in which the computer plays itself.

—Dr. Paul Kimmelman

Firecopter

by Dale A. Lear
Adventure International
P.O. Box 3435
Longwood, FL 32750
16K Extended Basic, Joystick
\$24.95 cassette



I HAVE ALWAYS WANTED to play a real 3-D game simulation in real time. With Dale Lear's newest release I can. And, it's one with a humane mission instead of mindless destruction as a goal. It seems that a local ex-con, Pyro Maniac, has assembled an army of torch-happy androids dedicated to the cremation of the city...

I have been assigned a laser-armed water cannon helicopter. The altitude control seems to be locked into rooftop height, and the heat resistant windshield develops high distortion around the edges of my field of view, not to mention making the buildings appear in simple outline form. The blades chop ominously overhead, while the city starts to burn before me. I rush to battle, joystick sluggish in my grip, to the nearest flames.

I almost have the flames completely out when a sniper appears. He turns out to be hard to hit, and before I can dispatch him my previous work is going up in smoke again. Precious seconds tick away as I douse it again, then proceed to sweep back and forth over the city. A bigger fire appears, and with it the warning FIRE LEVEL CRITICAL. As I struggle to keep this one under control I notice another building nearly out of view begin to disintegrate. Turning my hoses on it, I realize that I am too late to make a difference. The skeleton collapses, and then the "end of city" alarm sounds.

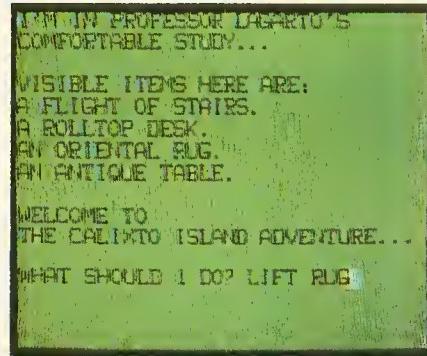
I like the concept of the game. It plays fairly realistically, but the response is too slow to be smooth and allow accuracy. I also missed the ability to climb higher to get a better look at the city as a whole; but then again, I am a perfectionist. The ability to turn the 'copter around would be nice, too; but I know how much the 6809E microprocessor must have been stretched to its limits already.

The game is very playable, and most important, fun. I have spent quite a few hours in the "hot seat" and haven't ever regretted the time spent. Now, if only one of the full-size arcade manufacturers could start trends in realistic and humane arcade games...

—J.T., Color staff

Calixto Island

Mark Data Products
24001 Alicia Pkwy, #226
Mission Viejo, CA 92691
(714)768-1551
\$24.95 cassette
\$27.95 disk



CALIXTO ISLAND IS AN adventure game that involves high-tech chicanery, grizzled beachcombers, marshes and hills, spooky houses with

strange rooms — basically the combination of about 10 kinds of action films. Sort of a "Raiders of the Lost Ark" in machine language. You get to jump around collecting, using and dropping treasures in the quest for the rightful spot in which to return some mysterious treasure.

For beginners in adventure games — don't lose heart. It is too easy to quit in Professor Lagarto's study feeling like you can't get anywhere. Here is a hint — sometimes it helps to examine things more than once. It also pays to fiddle with items more than once. You will be tempted to use the HELP command, and by all means try it. The command, indeed, does need help. It was so vague it became virtually useless — except for triggering some interesting situations. "Calixto Island" is the first adventure game I've seen in which the HELP command did something rather than just flashing the mandatory oblique message.

Another word for adventure players — make a detailed map, and catalog your moves, too. Old hands know this, but beginners will soon discover the necessity of this intricate job.

Watch out for the flashlight — the batteries are in bad shape. Make sure you know where everything is because you'll need to backtrack constantly to pick up items for later use.

I found the written instructions on the box and the screen instructions adequate but lacking in detail and needing more explanation about the story background, and, for beginners, a word about adventure games in general.

"Calixto Island" would have been less frustrating if a vocabulary had been included. It also seemed to do a bit of random jumping at times. For instance, trying to get out of the cellar and back to the study was perplexing. Sometimes one method worked and another time the game didn't understand my request.

A Save feature lets you save the game in progress and pick up on it later. It saves the game to tape or disk.

I liked "Calixto Island." As soon as I solved one puzzle, another situation presented itself. Do be careful in the dark, though: I must have cracked my head and died two dozen times. Now, I'm back at the pyramid and here's the crevice...

—Charles Holland

(Ed.'s note: Mark Data tell us the new "Calixto Island" has hi-res graphics!)

Have you heard about our new

EDUCATIONAL SOFTWARE LICENSE PLAN

**for
public and private schools?**



Max Jerman

The complete set of quality instructional software that was formerly available only at retail prices is now available to schools at less than **5%** of its current retail price.

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Over 250 disks containing more than 1200 lessons for grades K-9 in reading, spelling, language arts, math, problem solving, math games, reading games, and programs for young learners are included in the plan.

THE PLAN—Schools join together to form a cost-saving consortium of 50 or more members. One school or educational agency acts as Host. The Host will receive a master set of program disks and manuals. The consortium will be licensed to make as many copies of the masters as member schools need for their various computers.

THE BENEFITS—Consortium schools will automatically receive updates and new program releases at no increase in membership fee. There will be no shortage of quality software for the most popular computers.

THE COST—Only \$250 per school per year. There is an additional start-up cost of \$250 per school to cover initial expenses. Licenses for specific computers are available to large consortia or states at reduced cost.

ACT NOW—Form your own consortium and contact us. Contact us directly for the names of interested schools in your area.

At Last—A Software Solution

BERTAMAX INC.
Max Jerman, Ph.D.,
President



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NEW:PRODUCT\$

The Personal Touch

Associated Technology
Box 448
Estelle Springs, TN 37330
(615)967-9159

Personal Message, a program that adds a novel touch to birthdays, anniversaries, promotions, and other special occasions, is now available from Associated Technology.

It prints your message in characters seven inches high onto a standard fan-fold paper. From a menu of options users can select a variety of special occasion wishes. The wishes can be mixed with your own witty, or sentimental, message. The program costs \$19.95.

Software Licensing

Bertamax, Inc.
3647 Stone Way North
Seattle, WA 98103
(206)547-4056

Bertamax Inc. has an Educational Software Licensing Plan designed to solve the software acquisition problems facing schools that have more than one brand of microcomputer in their buildings and cannot afford to purchase separate program versions for each machine. Schools using a single computer can realize cost savings through membership, too. Schools must form user consortiums of 50 or more members, with one named as Consortium Host. Hosts will receive a master set of some 250 program disks and accompanying teachers' manuals. The host will be licensed to reproduce an unlimited number of copies of the program disks and manuals for use by member schools. The programs included in the plan will run on Apple, Atari, Commodore 64, IBM-PC, TRS-80 Color, and TRS-80 Model III microcomputers. The plan covers nearly all the instructional programs Bertamax has produced. Programs designed for teachers, counselors and administrators are not included.

The annual membership fee

per school will be \$250, but this year's start-up license fee is \$500 to cover initial costs. Member schools will automatically receive updates and new releases as they become available. Schools wishing to participate in the plan should contact Bertamax Inc. for names of interested schools near them. Consortiums are being licensed on a first-come basis.

Mailing List

JCL Data Processing Services
Box 283
Spotswood, NJ 08884

JCL first wrote a mailing list program for its own use, then decided to sell it to the public. For \$49 you can list up to 1,224 names and addresses, print labels either of the whole list or of entries in a specific zip code or town, create back-up tapes and restore corrupted disk files from tape, sort files by any field desired, modify addresses, and more. The program price includes a cassette copy of the Basic source code program and a manual. The program requires a 32K machine, a disk drive, and Radio Shack's disk operating system.

FICA-83

Parsons Software
118 Woodshire Drive
Parkersburg, WV 26101

FICA-83 is designed to calculate the approximate monthly pension check under the 1983 changes to the Social Security Act of persons born between 1915 and 1946. The program is an aid to retirement planning. It calculates Social Security pensions under a variety of options. The program may be used to send data either to the screen or to an 80-column printer. A 16K machine with Extended Color Basic and a tape recorder is required. FICA-83 comes with written instructions. The cassette costs \$19.95.

Supercord

Cord, Ltd.
1548 Brookhollow Drive
Santa Ana, CA 92705
(714)545-1643

New possibilities for computers and word processors are open with Cord Ltd.'s Supercord, a computer-typewriter interface. The Supercord links nine brands of electronic typewriters with over twenty brands of computers, including the Color Computer. Cord Ltd. was recently awarded a U.S. design

patent for Supercord. A partial list of electronic typewriters able to use Supercord includes Adler, Brother, Royal, Smith-Corona, and Silver-Reed machines.

Supercord is offered in a variety of combinations to enable its attachment to specific computers and typewriter models. There is even a Supercord II that has a 4K memory which lets computers receive data while typewriters type previously entered data.



KB-500 Keyboard

Key Tronic
Box 14687, Dept. E2
Spokane, WA 99214
(800)262-6006

The KB-500 keyboard is designed to improve the efficiency and capabilities of the Color Computer. It features a 15–20 percent higher data input rate, a user programmable function key, complete legend

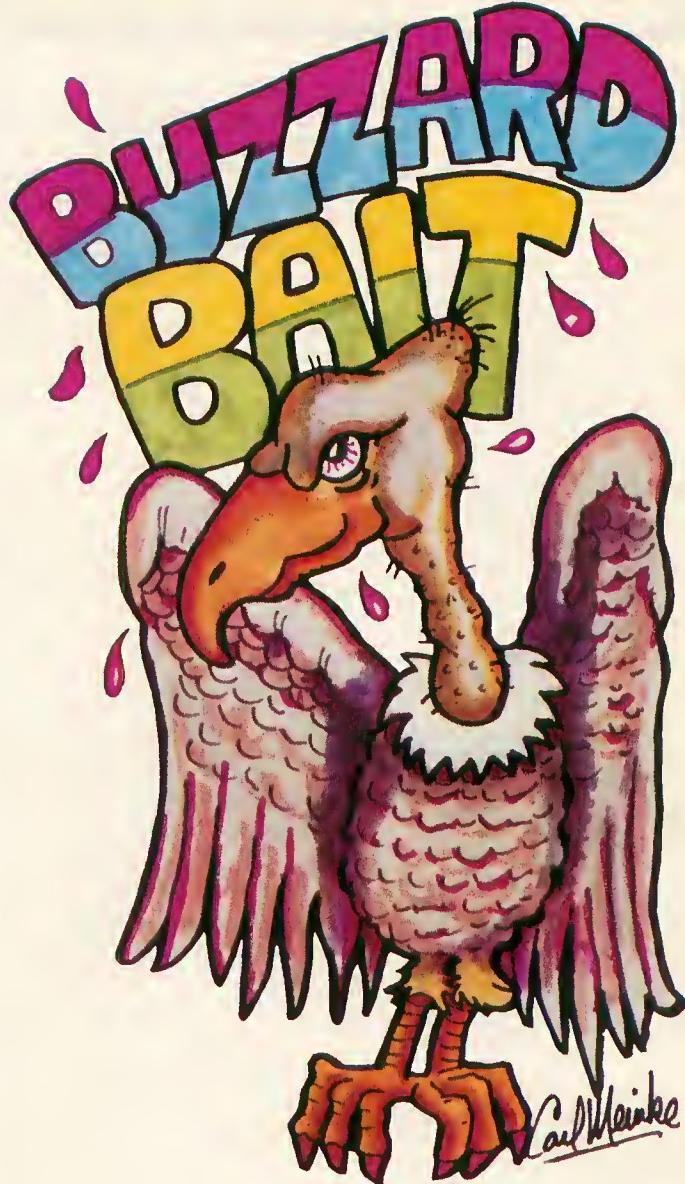
description, non-stick keys, high spring force on Clear and Break keys to prevent entry errors, full sculptured keytop array with low profile keytops, and locating "pips" on home row keys. The keyboard carries a suggested retail price of \$89.95, which includes the optional plug adapter for revision and newer models of the computer.





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Carl Weiske

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ARCADE ACTION GAMES



O-Pak

Frank Hogg Labs
770 James Street
Syracuse, NY 13203
(315)474-7856

FHL has taken its high resolution screen package from Flex, added a number of utilities, and is marketing it as "O-Pak." For the Radio Shack OS-9 operating system, O-Pak's predominant utility is the high resolution screen, with the same control codes and features found on Flex, including screen formats of 64 x 32, 64 x 24, 51 x 24 and 32 x 16. O-Pak comes with utilities that allow the copying of files between Flex, Radio Shack's OS-9 and standard Radio Shack DOS disk formats. Other commands allow cataloging disks and listing files of different disk formats. O-Pak will be sold for \$34.95.

Lizpack, Showpack

Crimson Software
(The Research Associates Group)
32 Beverly Heights
Tuscaloosa, AL 35404

Lizpack is a statistical analysis system that (Crimson touts) will demonstrate "beyond doubt" the capability of the Color Computer to compete with any other personal computer on the market. Aimed at both novices and experienced researchers, Lizpack contains 85 programs on seven disks and requires almost 800,000 eight-bit bytes for storage. Its core package includes categories on data files administration, ASCII formatted files conversion, descriptive statistics, comparisons of means, regression analysis, and more. There are packages on factor analysis, discriminant analysis and canonical correlation, cross tabulation, time series analysis and forecasting, too. The last package is Showpack, a disk graphics package for editing and labeling Lizpack graphs that

have been saved to disk. Lizpack requires 32K of memory, Extended Color Basic, a disk drive and a printer. The product in its entirety costs \$480. Individual packages range from \$50 to \$200.

The Computer Dictionary

Running Press
125 South 22nd Street
Philadelphia, PA 19103
(215)567-5080

Electronic terms, manufacturers' phrases, keypunchers' slang, and hackers' babble getting you down? Can't tell a disk from a database, a bubble sort from a breakpoint? Save downtime with *The Computer Dictionary*, released in January with up-to-the minute entries alphabetically listed and complete with reader-friendly definitions. The 128-page trade paperback retails for \$4.95.

How To Buy Software

St. Martin's Press
175 Fifth Avenue
New York, NY 10010

With chapter subtitles like "Everything Your Manuals Never Tell You," and "How To Get Thousands of (free) Programs over the Phone," and with a glossary entitled "The Computerese and Jargon Interpreter," author Alfred Glossbrenner has again taken aim at those users and would-be users who are still shaky on computing fundamentals. *How To Buy Software* is written for computer owners baffled by the plethora of software available to them. Right now it's being aimed at those booksellers who are considering selling software. The book is over 500 pages long and costs \$14.95.

Display Noise Eliminator

Emerald Systems
13052 Ferntrails Lane
Creve Coeur, MO 63141

The Display Noise Eliminator will remove the annoying jitter and wavy lines that your Color Computer is putting on your television display. Interfering signals come from the computer, disk controller, and disk drives. The Display Noise Eliminator is a special type of filter which traps this noise and prevents it from reaching television sets used as a display monitor. The Eliminator is supplied as a kit which takes two minutes to install. Neither special tools nor soldering is required. The cost is \$14.

record. Eight report formats can be custom designed. A summary report feature will summarize a database based on any field of information. Six label formats can be set up; each is given a title when it is designed and becomes a custom menu for later selection. Label and report formats can also be password protected. Record indexing allows an alphabetical order to be obtained for a database based on any field. Second and third order fields can also be selected. Records can be accessed by using the main sort field as a search field. A 1,000 record database can have any record located in 15 seconds or less. Over 60 pages of documentation cover the program. The cost is \$79.95.

MagiGraph

The Micro Works
Box 1110
Delmar, CA 92014
(619)942-2400

Pro-Color-File Enhanced is a program for creating programs. Users can define up to 60 data fields within each record. Up to 1020 bytes can be allocated for use by each and the fields can be spread over four disk drives to optimize storage capacity. Up to four data entry screens are available. Each is user defined and can be password protected. Data entry features full cursor control text editing with single keystroke field duplication from previous input or duplication of an entire record. Screens can be switched while entering data and a hard-copy can be generated from the screen display. Equations can be used to have calculations performed on all or selected records of the entire database automatically — handy for adding interest and late or monthly charges. Equations can also change new figures calculated without having to update each

more

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1520 Pacific Beach Drive
San Diego, California
92109

New Color Computers

Radio Shack
One Tandy Center
1800 One Tandy Center
Fort Worth, TX 76102
(817)390-3300

A pair of new 16K machines, the TRS-80 Standard Color Computer 2 and the TRS-80 Extended Color Computer 2, are being sold. The Standard lists for \$239.95, the Extended for \$319.95. The Standard comes with the Color Basic language, including data and string handling, dimensioned arrays, math functions, and nine-digit numeric accuracy. A 308-page user's manual offers instruction on writing programs with color, displays, and sound. The Extended version includes all that plus more advanced programming capabilities — one example is the creation of high-resolution color graphics using one-line commands. The Extended version also includes PEEK, POKE, and USR commands, multi-character variable names, string arrays up to 255 characters, and full-featured editing and tracing. Each are, of course, compatible with the current Radio Shack software line.

and object in the computerized workplace static-proof. For a copy of the brochure, write ACL.

Tax Command

Practical Programs, Inc.
Box 93104
Milwaukee, WI 53202

Tax Command, a Federal income tax calculation program, is in its second year of publication with all known bugs expunged. It provides a line by line method of calculating income tax, averaging income, itemizing deductions, capital gains and losses, and contains tax tables for every filing status. On computers with over 48K, Tax Command includes numerous other schedules as well. Tax Command contains built-in tables to calculate your tax refund or payment, and tells when to income average. The program does not print on your tax form, but prints/lists each entry needed. Tax Command's suggested price is \$24.95.

Static Control

ACL Inc.
1960 E. Devon Ave.
Elk Grove Village, IL 60007
(312)981-9212

"What Every Computer User Should Know About Static" is the title of a new brochure from ACL Inc. The eight-page folder contains information on electrostatic charges in computer environments and describes treatments that can eliminate glitches and downtime caused by uncontrolled static charge. The brochure explains the nature and cause of static charge build-up on people, equipment, and materials employed in computer environments, and outlines how ACL's Staticide liquid can make virtually every surface

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END OF FILE



The computer has changed the way information and information processing occurs in the world, and thus the way we think about the world and our lives. Governments of impoverished nations can be as affected by the computer age as the societies of industrialized nations, but the story does not end there.

The major difference between the flow of information in free and authoritarian societies is the freedom to own and fully use that electronic gadget tucked neatly on the shelves of homes, offices, and classrooms. Not only do we in the free world have easier access to computers; once we get them, our horizons are almost unlimited. We have what the characters in George Orwell's *1984* nightmare don't — a personal computer. The prophecy made in Orwell's book came true, but is weaker in some places than in others. Its horrors seem to hold true only when the authorities control most of the computers, and all the rules those computer users must live by. That inexpensive little Color Computer you're so fond of is as much your wreath of garlic on the door keeping Big Brother at bay as it is (to some) an ill-perceived symbol of a world fast growing impersonal, hard to understand, and just plain scary.

I don't mean to imply that all is well, and will continue so in the free world, now that Tandy and others have made computers as available as toasters. Nor do I mean that the key to world peace is the home computer.

Computers (of the other than home variety) influence many facets of daily life. Think of all the computer connections you are subjected to every day: phone, electric, gas and other utility usage and billing are tracked, assisted and compiled by computer. Many of us shop at bar code scanned checkout counters. The cars we drive were designed for economic thrift and safety by computers. Many radio stations switch from song to commercial to network news and back by computer. This list is only a superficial sampling of how we interact with or are otherwise affected by computerized processes every day. Much of what's listed is not generally considered a positive contribution to society. (I hate computerized radio stations.)

Now imagine the other situation. People in the Soviet Union are just as affected by computer connections, yet their ability to understand the process is limited because access to technological information is a politically granted right permitted to only a select few.

Years ago, before Tandy and Apple made microcomputers available to the free public, our understanding of computers was small. When your phone bill was incremented by a mistakenly large number of zeroes occurring to the left of the decimal point, your reaction was probably outrage. Now you're more likely to be understanding of how the mistake occurred; followed by outrage because you know you and your Color Computer wouldn't make such a mistake.

A computerist will read about a fellow computerist break-



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END OF FILE

ing into the Los Alamos computer system, or that of some mega-corporation somewhere with a feeling of smug satisfaction. But all alarms ring when we realize that information about us can be as easily obtained by anyone with patience and a knowledge (often limited knowledge) of mainframe protocol, or persons with "official access" to gathered information.

The danger inherent in the willfull gathering and dissemination of any and all information will not go away because you, and many others, own Color Computers and other micros. The misuse of information will become a greater danger as computers become more widespread.

That is today's challenge. We must look at our new technological responsibilities in an intelligent manner and not like children left unattended in a candy store. The breaking into a top secret computer system is no laughing matter. But what is more irresponsible: the act of trying to gain access to Los Alamos because of the challenge involved, or the fact that high-level defense secrets are stored in a system that can be violated by a teenager with idle time?

Government legislation is already gathering behind regulation of the ownership and distribution of electronic information. For instance, the U.S. Appeals Court recently overturned a previous Federal Court ruling that said, in effect, that a computer program burned onto a silicon chip or magnetic disk is not readable by a human and is therefore not protected by copyright rules and regulations. The case was *Apple vs Franklin Computers*. Franklin manufactures a work-alike version of the Apple II. The company admits that it copied the architecture of the Apple, but argues that the Apple II's ROM (the real subject of controversy) is not information that can be owned; after all, a ROM is no more than a circuit which uses electric impulses to turn switches on and off.

The Pennsylvania court that handed down the original ruling was irresponsible or confused. The judgement was conceived in ignorance of the technology it was affecting. When copyright laws were first established, computers were not even a fanciful subject for the imaginations of fiction writers. When the laws were revised in 1976, computers were mysterious science machines we occasionally read about in an article on the space program.

The ink was barely dry on the revised laws when Tandy produced the TRS-80 microcomputer. That micro had a 4K RAM keyboard with a nifty but limited version of Basic which was written by a relatively unknown company called Microsoft. This all happened less than a decade ago, in fact, all within the past six or seven years. No one, not even Tandy, thought microcomputers would sell so well. So it's not surprising how we all, including the government, fell so far behind so quickly. But everyone, especially the government, needs to get up to speed quickly. A good programmer works hard on his creation. He deserves the same protection as the writer of fiction. The Appeals Court corrected a bad ruling. But it will happen again, hopefully less frequently, until eventually society will be better informed so that it will be able to judge its technological sector more responsibly.

How we take on the responsibility of understanding and directing our technology and the acts and works it makes possible relates directly to how much we become regulated.

When considering my earlier question about who was more irresponsible — the Los Alamos computer experts or the teenager who broke into their system, I have to answer that the Los Alamos people were more at fault. It is their responsibility to effectively control access to their private information, just as it's my responsibility to safeguard my private word processing files. Who is more wrong in the *Apple vs Franklin* case? The court that made the first ruling. Legislators create laws and courts are supposed to interpret them. That is a safeguard against, in part, laws that need readjusting in light of modern realities. If the copyright laws are already becoming irrelevant, it is the court's function and responsibility to fine-tune them. That's why judges write statements explaining the basis of their decisions. But how can a judge fine-tune a law concerning a new part of society he doesn't understand? And how can a technology that is so all-encompassing be readily governed?

Computers have created a new responsibility that *everyone* must shoulder. The right and ability to access to information demands responsibility toward the dissemination of that information. George Orwell must have thought we wouldn't be able to handle the burden and would allow society's authorities to assume control by default. There's a good chance he will be proven wrong. As long as we, as a society, understand the capabilities and limitations of computers, we maintain the ability to keep them in their places — on a shelf somewhere in your house, office, or classroom.

— K.L., Publisher

FOR...NEXT(02,84)



FEBRUARY IS A LONG month, half-way between spring and winter. To help you while away those mid-winter blues, we have a special issue with lots of games planned. You'll also learn who won the Summer Programming Project (remember summer?).

Commander's ROM dissection will continue, Barden has a primer on disks ready, and we'll have an interview with Steve Bjork, along with lots and lots more! ■■■

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